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VOL. 55. No. 1.—NOVEMBER, 1919.

CONTRIBUTIONS FROM THE GRAY HERBARIUM OF
HARVARD UNIVERSITY.

NEW SERIES.—No. LX.

- I. On tropical American Compositae, chiefly Eupatorieae.
- II. A Recension of the Eupatoriums of Peru.

BY B. L. ROBINSON.

(Continued from page 3 of cover.)

VOLUME 55.

1. ROBINSON, B. L.—I. On tropical American Compositae, chiefly Eupatorieae. II. A Recension of the Eupatoriums of Peru. pp. 1-88. November, 1919. \$1.25.



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I. ON TROPICAL AMERICAN COMPOSITAE, CHIEFLY
EUPATORIEAE.

BY B. L. ROBINSON.

Presented June 26, 1919.

Received June 26, 1919.

DURING the past year the writer has continued his studies on the South American members of the genus *Eupatorium*, giving particular attention to those of Peru and Bolivia. Of the Peruvian it has proved possible to complete a recension, which, by bringing together widely scattered data, placing on record a considerable number of new species, and furnishing specific keys in each section, will, it is hoped, render a knowledge of these plants much more readily accessible and considerably facilitate their precise identification.

There have been several sources of new information regarding tropical American Eupatoriums and many facts have been observed which were not available during the preparation of the writer's revision of the Colombian, Venezuelan, and Ecuadorian species, a treatment completed about a year ago (Proc. Am. Acad. liv. 235-367, 1918). Thus, for instance, the later portions of Dr. F. W. Pennell's extensive collections from Colombia proved to contain interesting *Eupatorium* material to an unsuspected extent, including several additional novelties. A small Colombian collection, prepared by Bro. Aristé-Joseph and received at the Gray Herbarium in continuation of exchange from the United States National Herbarium, has yielded still another new species from the vicinity of Bogotá, a region already exceptionally rich in its representatives of the genus. A somewhat extended collection of the flora of Caracas and adjacent portions of northern Venezuela has been obtained from Prof. H. Pittier. This has given considerable supplementary information regarding the Eupatoriums of the regions explored. Finally, the expedition of Dr. J. N. Rose to Ecuador has brought in the most notable single collection as yet received from that country, including a suite of some twenty-eight different Eupatoriums, among which at least four merit

“m.s.”

recognition as new to science, while others show notable rediscoveries of plants not secured for many decades.

As has been the case in the preparation of several former papers relating to the *Eupatorium* tribe, much valued aid has been received from the New York Botanical Garden, the United States National Herbarium, and the Field Museum of Natural History, all of these establishments having lent for examination highly interesting material, which has formed the basis of many of the observations here recorded.

In elaborating the Peruvian species much aid has been derived from material borrowed from the Royal Gardens at Kew and from a considerable suite of specimens collected by Dr. A. Weberbauer and lent some years ago from the Royal Botanical Museum in Berlin for study and identification.

Prof. H. Pittier has kindly called to the writer's attention some geographical errors in the paper on the Venezuelan *Eupatoriums*. Among these are the employment of several obsolete and now supplanted place-names, and several orthographical slips which, while regretted, are happily not of a kind likely to cause serious error or misunderstanding. More annoying, however, in this respect was the writer's not unnatural but entirely erroneous identification of "Colonia Tovar"—a place frequently mentioned upon Fendler's labels—with the town of Tovar in the state of Mérida. In consequence, attention is here particularly directed to the fact that Colonia Tovar, the base of much of Fendler's Venezuelan work, is a small town not very distant from Caracas and situated in the mountains somewhat back from the coast in the northern part of the state of Aragua. This Tovar was unfortunately not recorded on the maps consulted during the preparation of the earlier paper.

A few notes, diagnoses, and transfers are here published concerning other *Compositae* which, mostly on account of habitat similarity, have been submitted for identification in connection with these studies on the *Eupatoriums*.

The abbreviations employed in the present publication to indicate the different botanical establishments are the same as in former papers, those of most frequent occurrence being as follows: *Gr.* for the Gray Herbarium; *U. S.*, the U. S. National Herbarium; *N. Y.*, the New York Botanical Garden; *Field Mus.*, the Field Museum of Natural History, Chicago; *K.*, the herbarium of the Royal Botanical Gardens, Kew; *Brit. Mus.*, the British Museum of Natural History, South Kensington, London; *Par.*, the Muséum d'histoire naturelle, Jardin des plantes, Paris; *DC.*, the "Prodromus collection" in the

DeCandollean Herbarium, Geneva; *Berl.*, the Botanical Museum, Dahlem, Berlin. The few other similar abbreviations which occur are believed to be sufficiently clear without particular explanation.

Ophryosporus (§ **Euophryosporus**) **bipinnatifidus**, spec. nov., caulinibus (vel rāmis) curvato-adscendentibus vel erectis 2-3 mm. crassis ut videtur paullulo lignescentibus inferne delapsu foliorum nudatis nodulosis superne densissime foliosis; foliis alternis saepissime in axillis proliferis deltoideo-ovatis profunde bipinnatifidis utrinque dense griseo-pubescentibus 2-3 cm. longis et latis, lobis anguste oblongis vel oblanceolatis vix acutiusculis integris vel saepe lobatis; petiolo 5-12 mm. longo cuneatim alato; thyrsi terminali solitario vel pluribus ovoideis densis ca. 3 cm. longis 2.5 cm. crassis; capitulis ca. 4-floris sessilibus vel breviter pedicellatis ca. 5.5 mm. longis; involueri squamis principibus plerisque 4 subaequalibus cum 1-2 multo minoribus calyculatis viridibus tenuibus sordide pubescentibus; corollis albis ca. 3.2 mm. longis, tubo proprio glandulari-puberulo; limbi dentibus 5 ovato-deltoideis patentibus; antheris apice omnino exappendiculatis basi subsagittatis; styli ramis filiformibus substruncatis apice paullo incrassatis; achaeniis (valde immaturis) hispidulis; pappi setis ca. 18 inaequalibus ca. 2 mm. longis scabratiss.—PERU: in very arid ground, Posco, between Mollendo and Arequipa, 6 Aug. 1914, *Dr. & Mrs. J. N. Rose*, no. 18,805 (U. S., phot. and fragm. Gr.). This beautifully distinct species adds a third to the alternate-leaved section of the genus. In habit and cutting of the leaves it recalls the Brazilian *Lomatozona artemisiaefolia* Bak. in Mart. Fl. Bras. vi. pt. 2, 199, t. 54, f. II (1876), but of course differs from it significantly in many technical characters, such as its exappendiculate anthers, longer pappus, alternate leaves, etc.

Ophryosporus (§ **Ophryochaeta**) **ovatus**, spec. nov., petiolis junioribus et inflorescentia puberulis exceptis glaberrimus; caule tereti purpurascente folioso; foliis oppositis graciliter petiolatis deltoideo-ovatis leviter crenato-serratis firmiusculis utrinque viridibus glaberrimis sublucidis a basi 3-nerviis minute prominulenterque reticulatis subacutis ca. 4 cm. longis 3 cm. latis; petiolo ca. 1 cm. longo; panicula ovoidea terminali ca. 1 dm. alta et crassa multicapitulata, ramulis pedicellisque crispe puberulis; capitulis 4.5 mm. altis 3 mm. diametro ca. 7-floris; involueri campanulati squamis ca. 6 tenuibus substramineis ellipticis subaequalibus apice rotundatis eroso-ciliolatis dorso glabris; corollis ca. 3.5 mm. longis a media parte modice ampliatis 5-dentatis extus ubique minutissime glanduloso-puberulis; antheris

omnino exappendiculatis; styli ramis apice incrassatis et fuscescentibus; achaeniis (immaturis) 1.3 mm. longis praecipue in angulis paullo glandulari-puberulis; pappi setis ca. 27 inaequalibus barbellatis.—PERU: at Chachapoyas, *Matheus*, no. 1370 (K.). Apparently nearest *O. Sodiroi* Hieron. but differing in its firmer-textured broader leaves which are subtruncate at base and more coarsely crenate-serrate.

Eupatorium (§ **Subimbricata**) **anisodontum**, spec. nov., habitu indumento, aliis multis *E. Gaseae* subitus descriptae simile sed differt conspicue foliis triangulare-hastatis caudato-acuminatis basi profundius cordatis irregulariter grosse dentatis (dentibus aliis parvis plerisque rotundatis aliis acutis majusculis usque ad 1 cm. longis); petiolo 3-5 cm. longo; inflorescentia corymbosa bene pedunculata densissima ca. 1 dm. diametro valde convexa; capitulis 1 cm. longis ca. 10-floris; involucri campanulato-subcylindrici squamis ca. 14 stramineo-viridibus tenuibus puberulis plerisque ovatis obtusis, intimis angustioribus acutis; corollis glabris 6 mm. longis tubulosis leviter sursum ampliatis; achaeniis 4 mm. longis glabris; pappi setis ca. 50 stramineo-albidis inaequalibus.—PERU: Province of Chachapoyas, *Matheus*, 1836. 87. H. (K., phot. and fragm. Gr.).

E. ARCUANS Robinson, Proc. Am. Acad. liv. 237, 288 (1918). The type of this recently described species, namely *Triana*, no. 1191 (K.), though believed to have come from Colombia, was unaccompanied by data as to the exact locality of collection. Happily the species has now been rediscovered by Bro. Ariste-Joseph, being represented by his no. A250 (Gr.) from Guadalupe, near Bogotá. This specimen recently received from the U. S. National Museum proves to agree in all features very closely with the original plant of *Triana*. The species may therefore be definitely located as occurring in the mountains near Bogotá in the Department of Cundinamarca.

E. (§ **Eximbricata**) **Aristei**, spec. nov., fruticosum patenter ramosum; caulis teretibus griseo-brunnescentibus glabratibus cum lenticellis instructis; ramis oppositis curvato-adscendentibus brevisime puberulis vel juventate sordide tomentellis vel griseo-tomentosis foliosis; foliis oppositis lanceolato-oblongis attenuatis acutis basi rotundatis crenulatis vel obtuse serrulatis vel subintegris coriaceis 7.5-9.5 cm. longis 2.5-3 cm. latis penniveniis supra (costa media paullo puberula excepta) glabris sublucidis sub lente valde reticulatis (areolis minutis, vix 0.3 mm. diametro), subitus paullo pallidioribus laxe pubescentibus obscuris; petiolo pubescente gracili 11-17 mm. longo; corymbis terminalibus planiusculis vel modice convexis multicapitulatis sordide pubescenti-tomentosis; bracteolis linearibus

saepius patentibus curvatis stramineis firmiusculis; capitulis 10-12-floris; involucri squamis ca. 13 ovato-oblongis obtusis ciliatis dorso laxe pubescentibus; corollis albidis 4 mm. longis, tubo proprio 1 mm. longo glanduloso-atomifero, faucibus paullo ampliatis 3 mm. longis glabris; pappi setis ca. 17, sordide albis barbellatis; achaeniis (immaturis) ca. 2 mm. longis in angulis cum glandulis globosis minutis sessilibus instructis.— COLOMBIA: at Verjón, Sept., 1917, *Bro. Aristé-Joseph*, no. 150A (Gr.).

The leaves of this species vary from crenulate or serrulate to essentially entire and at different stages of development their reticulation, as seen from above, is of strikingly different size of mesh. These differences, however, are very clearly those of age or of individual development and have no classificatory worth. *E. Aristei* is clearly related to the Venezuelan *E. Jahni* Robinson, Proc. Am. Acad. liv. 248 (1918), but that species has leaves of a more elliptic-oblong contour, scarcely more narrowed to the apex than to the base, their teeth somewhat larger, more salient, and mucronate, the petioles shorter, and the heads only about 6-flowered.

E. (§ Subimbricata) Bridgesii, spec. nov., ut videtur herbaceum (basi ignota) gracile erectum 3 dm. vel ultra altum; caule tereti 2-3 mm. diametro stramineo-viridi tenuiter puberulo (pilis brevissimis incurvatis); internodiis usque ad 6 cm. longis; foliis suboppositis vel superne alternis rhomboe- vel lanceolato-ovatis utroque attenuatis paullo supra basin 3-5-nervatis 5 cm. longis 1.5-1.8 cm. latis tenuiter membranaceis pallide viridibus supra praesertim ad marginem scabro-puberulis subtus vix pallidioribus in nervis et venis principibus albidis puberulis margine cum dentibus parvis mucronatis paucissimis (saepe utroque 1-2 solis) instructis; petiolo supra canaliculato anguste marginato 4-7 mm. longo; corymbo composito planiusculo 2-2.5 dm. diametro, ramis et pedicellis (3-6 mm. longis) stramineo-viridibus puberulis; capitulis numerosis ca. 25-floris 7 mm. altis 4 mm. diametro; involucri squamis ca. 22 valde inaequalibus gradatis pallide viridibus plerisque 2-costulatis, extimus brevibus ovato-lanceolatis acuminatis dorso paullo adpresso puberulis apice squarroso-recurvatis, intermediis gradatim longioribus lanceolatis attenuatis subglabris, intimis linearie-oblongis acutis glabris; corollis roseis 4 mm. longis glabris sursum sensim ampliatis limbo extus paullo granulatis; achaenis atro-brunneis in costis pallidioribus sursum hispidulis; pappi setis ca. 27 vix 2.5 mm. longis barbellatis.— BOLIVIA: without locality, *Bridges* (K., phot. and fragm. Gr.).

E. CELTIDIFOLIUM Lam., var. *HIRTELLUM* Robinson, Proc. Am. Acad.

liv. 238, 311 (1918). This continental variety of the West Indian *E. celtidifolium* was, at the time of its description, known to the writer only from Colombia, where it had been twice collected near Santa Marta. It has been rediscovered in northern Venezuela at Lower Cotiza (Agr. Exp. Sta.), near Caracas, on the sunny side of a gorge, alt. 925 m., Pittier, no. 7897 (Gr.). Prof. Pittier describes it as a shrub or small tree, 3-4 m. high, with small greenish flowers on drooping branchlets.

E. (§ *Eximbricata*) *choricephaloides*, spec. nov., ut videtur herbaceum (basi ignota) verisimiliter 1 m. vel ultra altitudine; caule ramisque gracilibus flexuosis teretibus dense patenterque glandulosopuberulis; internodiis usque ad 1 dm. longis; foliis oppositis deltoideo-ovatis apice acuminatis basi subtruncatis vel leviter patenterque cordatis lateraliter serratis- vel crenato-dentatis (dentibus inaequalibus rotundatis vel subacutis utroque ca. 10) membranaceis supra dense puberulis et in nervis venisque maximis villosis ca. 6 cm. longis et 4.5 cm. latis a basi 3-nerviis; petiolo 1-3 cm. longo glanduloso-tomentello; panicula laxissima foliaceo-bracteata 4 dm. alta 3 dm. diametro dense glandulosopuberula; pedicellis filiformibus 1-2.6 cm. longis; capitulis dissitis ca. 7 mm. altis 25-30-floris; involueri campanulati squamis subaequalibus anguste oblongis vel oblanceolatis acutis viridibus 2-3-costatis dorso puberulis ca. 4 mm. longis apicem versus scariosis et erosis; corollis albis glabris, tubo proprio fauces ampliatas subaequante; dentibus limbi brevissimis ca. 0.3 mm. longis; achaeniis pallide brunneis 1.8 mm. longis in angulis hispidulis in faciebus concavis laevibus; pappi setis ca. 12 albidis minute scabridulis.—PERU: Department Amazonas, Province Chachapoyas, Mathews (K., phot. and fragm. Gr.). In habit and very loose inflorescence recalling the Mexican *E. choricephalum* Robinson, but differing in many points.

E. (§ *Subimbricata*) *coelocaula*, spec. nov., fruticosum; ramis curvato-adscendentibus teretibus robustis griseo-brunneis maturitate glabris laevibus fistulosis; internodiis 3-4 cm. longis; foliis oppositis lanceolato-oblongis vel rhombo-lanceolatis longe acuminatis serratis (basi cuneata integra excepta) penniveniis usque ad 17 cm. longis et 6 cm. latis firmiusculis glaberrimis (maturitate) supra viridibus subtus pallidioribus glaucis puncticulatis; petiolo 1-4 cm. longo rubescente glabro; foliis supremis minoribus lanceolatis integerrimis; corymbo sessili terminali composito leviter convexo 1-1.5 dm. lato dense crispeque fulvo-tomentello; capitulis numerosissimis inter se binis vel trinis aggregatis sessilibus vel brevissime pedicellatis ca. 5-floris 10-12 mm. longis 2-3 mm. crassis graciliter cylindricis; in-

volueri squamis ca. 12 subtriseriatis stramineis extimis ovatis acutiusculis interioribus gradatim longioribus anguste ellipticis delicate striatulis apice obtusiusculis glabris; corollis 7 mm. longis sensim sursum paullo ampliatis glabris; antheris fere liberis longiuscule appendiculatis; achaeniis 3 mm. longis nigris lucidis obsolete granulatis; pappi setis ca. 30 inaequalibus stramineo-albidis.—PERU: Province of Chachapoyas, 1835, *Mathews*, no. 1373 (K., phot. Gr.). In form the involucre of this species is nearly cylindrical yet the scales do not have the texture, nervation, or deciduous nature of § *Cylindrocephala* and it seems best placed in § *Subimbricata*.

E. (§ Subimbricata) Cookii, spec. nov., fruticosum dense villosum, pilis primo longis gracillimis sub lente pulcherrime purpureo-articulatis tardius plus minusve attritis; caule tereti purpureo, internodiis usque ad 13 cm. vel ultra longis; ramis patentibus vel divaricatis plerisque curvato-adscendentibus; foliis ovatis acuminatis crenato-serratis (basi rotundata vel subcordata integra excepta) ima a basi 3(-5)-nervatis supra obscure viridibus et crispe puberulis subtus paullo pallidioribus sordide pubescentibus et glandulari-atomiferis 3-6 cm. longis 1.8-3.6 mm. latis; petiolo 1-2 cm. longo; pedicellis 1-4 mm. longis; capitulis glomeratis ca. 22-floris 7 mm. altis 4 mm. diametro; involucri campanulati ca. triseriati substraminei squamis ca. 19 valde inaequalibus, interioribus anguste oblongis apice rotundatis sed apiculatis saepe 2-costulatis viridibus vel purpureo-tinctis saepissime dorso granulatis vel leviter puberulis, intermediis et extimis gradatim brevioribus acuminatis ciliatis distinctius puberulis; corollis albis 3.8 mm. longis, tubo proprio vix 0.8 mm. longo, faucibus sensim ampliatis cylindricis, limbo hispidulo; achaeniis fusco-brunneis 1.5 mm. longis glabris; pappi setis ca. 27 laete albis minute scabidis.—PERU: Dept. Cuzco: Lucumayo Valley, alt. 1800-3600 m., 19 June, 1915, *O. F. Cook & G. B. Gilbert*, no. 1352 (TYPE, U. S., phot. Gr.). An old specimen, *Mathews*, no. 1126, collected at "Andimarca" and now in the Kew Herbarium, is apparently of this species. It differs chiefly in its shorter pubescence, which on the mature branches is scarcely more than a somewhat glandular puberulence. However, the longer and articulated pubescence, so copious on the Cook & Gilbert specimen, is found to some extent on the younger petioles, etc., of the Mathews plant, and its absence from the older parts may well be due to some form of attrition, disarticulation, or absorption. At all events, species have been noted elsewhere in the genus which appear to pass from a stage with copious articulated and non-glandular pubescence to one in which glandular puberulence is prevalent.

It seems probable that the "Andimarca" mentioned is Andamarca in the Department of Junin, a locality about 300 km. distant from Lucumayo Valley. The leaves in the Mathews plant are somewhat more deeply cordate and a little more bluntly toothed than in the Cook & Gilbert plant, but in the presence of pretty close agreement in all essential features these differences do not appear of much classificatory moment. There being, however, a slight doubt as to the locality of the Mathews specimen, it has seemed better to select the other as the type, particularly as a species (described below) had already been dedicated to Alexander Mathews.

E. CUTERVENSE Hieron. in Engl. Bot. Jahrb. xl. 383 (1908). This species was originally found from near Cutervo and Tambillo in Northern Peru by von Jelski. It is described (Hieron. l. c.) as having the stem up to 2.5 cm. in thickness. This certainly must be a clerical error for 2.5 mm., since surely no plant with a stem 2.5 cm. thick would be characterized as "suffruticosa vel fruticulosa." The species is furthermore described as having the leaves sessile or short-petioled, the petioles scarcely 2 mm. long. The corolla is said to be glabrous externally, the pappus whitish, and the achenes roughish on the upper part of the angles. So far as known to the writer the species has not been subsequently reported. However, specimens have now been collected in the vicinity of Nabón, Ecuador, 25-26 Sept., J. N. Rose, A. Pachano & G. Rose, no. 23,014 (Gr., U. S., N. Y.), which correspond closely in nearly all described features to *E. cutervense*, having the same much-branched habit, small, roundish-ovate subcordate, acute to very shortly acuminate leaves, which are similarly crenate on the somewhat revolute margins. The articulated pubescence is the same, the inflorescence, and numbers of florets (35), scales (15-16) and pappus bristles (18) fairly approximate those given by Hieronymus. The chief differences observed are as follows: the leaves in the Ecuadorian plant are never really sessile and the petioles are sometimes as much as 4 mm. long; the corolla-teeth are dorsally hispid; the achenes are hispidulous on the angles throughout their length; and the pappus-bristles are distinctly roseate. These minor differences, however, do not appear sufficient to justify the separation of the Ecuadorian plant, at least until it is possible to have it carefully compared with the type of *E. cutervense*. It is therefore provisionally referred to that species.

***E. (§ Eximbricata) dasyneurum*, spec. nov.,** herbaceum erectum virgatum ut videtur annum 6 dm. vel ultra altum; caule tereti densissime piloso, pilis patentibus attenuatis articulatis saepe curva-

tis; internodiis 1.5-5 cm. longis; foliis oppositis breviter petiolatis ovatis acuminatis obscure serratis basi rotundatis vel levissime cordatis 2-3 cm. longis 1.5-2 cm. latis supra subglabris solum sparse in nervis venisque pilosis bullato-rugosis post exsiccationem nigrescentibus subitus pallidioribus praecipue in nervis venisque sordido-hirsutis (pilis densis attenuatis curvatis maturitate firmiusculis) a basi 3-nervatis submembranaceis margine juventate forte revolutis; petiolo 2-4 mm. longo hirsuto; inflorescentia e corymbo unico composito terminali convexo 1 dm. diametro sistente vel e corymbis minoribus densiusculis pluribus ramos terminantibus paniculam plus minusve elongatam conjunctim formantibus; capitulis numerosis 7 mm. longis et crassis ca. 30-floris pedicellatis; involuci campanulati squamis ca. 17 plerisque aequalibus lanceolato- vel oblongo-linearibus acute mucronatis substramineis 2-3-costulatis ciliolatis dorso plus minusve sordido-pubescentibus, 2-3 extimis angustissimis subulatis paullo brevioribus; corollis albis ca. 3.8 mm. longis limbum versus paullo hispidulis; tubo proprio fauces distincte ampliatas subaequante; achaeniis 1.8 mm. longis maturitate nigris hispidulis; pappi setis ca. 18 albidis corollam subaequantibus apicem versus sensim incrassatis.—COLOMBIA: in field, Antizales, Dept. Bolívar, alt. 1500-1800 m., Dr. F. W. Pennell, no. 4460 (N. Y., Gr.).

This species is obviously close to *E. sotarense* Hieron., which, however, has the pubescence on the pedicels of wide-spreading gland-tipped hairs, while in *E. dasyneurum* it is of incurved non-capitate hairs. *E. sotarense* also has the leaves, if one may judge from its description, considerably less pubescent beneath, and the involucral scales less attenuate.

E. DENDROIDES Spreng. Syst. iii. 415 (1826). In treating this species in his recent study of the Ecuadorian Eupatoriums, Proc. Am. Acad. liv. 359 (1918), the writer by oversight omitted a reference to Bentham, Pl. Hartw. 135 (1844), where there is a record of its collection in the mountains of Loja, by Hartweg, no. 755. There is an unnumbered Hartweg specimen of the species from the same locality in the herbarium of the New York Botanical Garden. By error in the paper mentioned the species was given a parenthetical authority (HBK.) which should have been deleted.

E. DOMBEYANUM DC. Prod. v. 167 (1836). This species, described from material collected in South America by Dombey, but without indication of locality or even of the country, has never been satisfactorily identified. It belongs to § *Eximbricata* and is described as "fruticosum glaberrimum." The heads are in a loose panicle, many

of them nodding on curved or flexuous pedicels; the leaves are ovate and apparently membranaceous.

Entirely glabrous and at the same time thin-leaved members of § *Eximbricata* are not very numerous. Finding a plant of this general nature among the specimens collected by Mr. H. H. Smith near Santa Marta, Colombia, the writer (Proc. Am. Acad. liv. 315) ventured to place it doubtfully in *E. Dombeyanum* with which it appeared to have many points in common. However, further study of this and the related plants from Peru renders it decidedly unlikely that the Colombian plant can have anything to do with the original *E. Dombeyanum*. It is accordingly characterized below as a new species under the name *E. psilodorum*.

Similar efforts to identify with *E. Dombeyanum* DC. certain Peruvian plants, notably Weberbauer's nos. 860, 2766, and 3253, have likewise failed. No. 860 (described below as *E. stictophyllum*), while possessing rather closely the leaf-contour of *E. Dombeyanum* has considerably denser and corymbiform inflorescences, the young stems, branches, and pedicels are pulverulent-puberulent to a degree that DeCandolle would scarcely have described as "Glaberrimum;" the achenes are covered with sessile glands and the petioles are muriculate, which is clearly not the case in the type of *E. Dombeyanum* of which there is a photograph in the Gray Herbarium; finally, the leaves are rather conspicuously dark-punctate beneath — a feature, which had it been equally manifest in the type of *E. Dombeyanum*, would almost certainly have been mentioned by so careful a writer as DeCandolle.

Weberbauer's nearly related nos. 2766 and 3253 (below described as *E. simulans*) differ from *E. Dombeyanum* in having lanceolate (rather than ovate) leaves, which are pinnately veined rather than 3-nerved from above the base; the stems are much more leafy, with mostly short internodes; the branches, petioles, pedicels, and achenes are all perceptibly granular-puberulent, and the involucral scales are more pubescent than is indicated by DeCandolle in his character of *E. Dombeyanum*.

After prolonged effort to take into account all characters and make reasonable allowance for individual variation, it has seemed impossible to refer any of these specimens to *E. Dombeyanum*. On the other hand, they are so close as to give added strength to the view that the species will ultimately be found in Peru, where the greater part of Dombey's South American collecting was accomplished.

E. (§ Subimbricata) *drepanoides*, spec. nov., fruticosum usque

ad 4 m. altum glabrum; ramis curvatis subteretibus foliosis post exsiccationem paullo costulatis; internodiis 1-2 cm. longis; foliis oppositis lanceolatis falcatis acuminatis basi acutis serratis (dentibus 0.6 mm. altis 2-3 mm. latis) firmiusculis supra minute atomiferis planis (sine reticulatione prominente venarum) subtus paullo pallidioribus supra basin 3-nerviis demum penniveniis 7-9 cm. longis 1.8-2.1 cm. latis; petiolo glabro ca. 2 cm. longo; corymbis terminalibus sessilibus compositis convexis 1 dm. vel ultra diametro, ramulis pedicellisque arachnoideo-puberulis; capitulis numerosis ca. 7-floris 6 mm. (valde immaturis) longis 3.5 mm. diametro; involueri anguste campanulati squamis ca. 13 ovato-oblongis acutiusculis striatulis purpurascenti-stramineis arachnoideis ciliatis; corollis graciliter tubulosis conspicue 5-nervatis granulatis; dentibus limbi 5 lanceolato-oblongis; achaeniis (valde immaturis) deorsum decrescentibus granulatis; pappi setis ca. 23.—PERU: open woods by a brook, Comin, Prov. Huari, Dept. Ancachs, alt. 3600-3700 m., 18 Apr., 1903, *Weberbauer*, no. 2918a (Berl., phot. and fragm. Gr.). This species, though pretty clearly undescribed, is represented only by fragmentary and immature material.

Near *E. coelocaulis*, described above, but with much smaller and relatively narrower and duller leaves, arachnoid-ciliate involucral scales, etc.

E. (§ *Subimbricata*) *endytum*, spec. nov., fruticosum 1-2 m. altum breviter ferrugineo-velutinum; caulis teretibus fistulosus usque in paniculam foliosis; internodiis 5-8 cm. longis; foliis oppositis oblongo-ovatis acutis serrulatis (dentibus ca. 0.7 mm. altis 2-3 mm. latis) basi rotundatis utrinque tomentellis subtus distincte pallidioribus penniveniis 8-12 cm. longis 3.6-6 cm. latis paullo firmiusculis vix membranaceis; petiolo subteret 1.5-2 cm. longo; panicula ovoidea oppositiramea ca. 1.5-1.8 dm. alta et diametro apice rotundata; ramis inflorescentiae late patentibus infra nudis solum apicem versus capituliferis; capitulis ca. 37-floris 7 mm. longis 7 mm. diametro; involueri campanulati squamis ca. 21 acutiusculis 2-3-seriatim imbricatis sed vix gradatis exterioribus ovato-oblongis persistentibus dorso brunneo-tomentellis nervis obscurissimis, squamis interioribus angustioribus parce pubentibus mox deciduis; corollis sordide albis 3.5 mm. longis sursum gradatim ampliatis glabris; styli ramis filiformibus rectiusculis laevibus vix clavellatis; antheris apice cum appendice tenui ovata instructis; achaeniis immaturis 1.5 mm. longis glabris; pappi setis ca. 20 corollam subaequantibus paullo scabratris.—PERU: between Sandia and the tambo Azalaya, on the

way from Sandia to Chunchusmayo, among bushes at an altitude of 1500-2000 m., 5 June 1902, Dr. A. Weberbauer, no. 1074 (Berl., phot. and fragm. Gr.).

E. (§ *Cylindrocephala*) *eripsimum*, spec. nov., suffruticosum 3-5 dm. altum ramosum decumbens; caule tereti et ramis saepissime curvato-adscentibus foliosis teretibus puberulis; foliis parvulis oppositis lanceolatis vix petiolatis integriusculis vel utroque obscure 1-3 dentatis membranaceis 2.5-3.5 cm. longis (internodiis subaequantibus) 5-10 mm. latis a basi cuneata 3-nervatis supra glaberrimis sed saepe minute pustulatis subtus in nervis obscure appresse pubentibus; corymbis terminalibus 3-8-capitulatis laxis; capitulis ca. 44-floris; involuci campanulato-cylindrici squamis ca. 3-4-seriatim gradatis, extimis ovato-oblongis, intimis oblongo-linearibus, omnibus caducissimis praeter marginem ciliolatum glaberrimis stramineis 1-4-costulatis lucidulis; receptaculo planiusculo sed apice pedicelli post delapsum squamarum denudato subcylindrico; corollis lilacinis (post exsiccationem nigrescentibus) graciliter tubulosus vix sursum ampliatus glaberrimus 8.5 mm. longis; dentibus limbi 5 angustis recurvatis; styli ramis longissimis leviter clavellatis rectiusculis patentibus ca. 6 cm. longis; achaeniis gracilibus deorsum paullo decrescentibus adpresse puberulis 4.5 mm. longis; pappi setis ca. 35 albis barbellatis subaequibus corollam subaequantibus.—PERU: in open places among grasses, bromeliads, and cacti, alt. 2200-2500 m., Caraz, Dept. Ancachs, 19 May, 1903, Weberbauer, no. 3003 (Berl., phot. and fragm. Gr.).

A species somewhat resembling *E. serratuloides* HBK. but with narrower less toothed leaves somewhat hairy beneath, and considerably longer florets. Like *E. serratuloides* it has somewhat the habit of § *Praxelis*. The excessively caducous nature of the scales and florets, giving the specimens a dilapidated appearance, has suggested the specific name, which, happily, is not likely to have been hitherto employed.

E. (§ *Eximbricata*) *flexile*, spec. nov., suffruticosum gracile subscandens 2 m. altum; caulis teretibus flexuosis molliter breviterque sordido-tomentellis; foliis ovatis caudato-acuminatis cordatis a basi 5-7-nerviis tenuibus supra puberulis subtus praecipue in nervis griseo-pubescentibus ca. 6 cm. longis 3 cm. latis plus minusve lateraliter leviter remoteque pauci-dentatis; petiolo gracili flexuoso ca. 1 cm. longo; panicula ampla pyramidata 2-4 dm. alta 1.5-2.5 dm. diametro laxa foliaceo-bracteata; pedicellis filiformibus flexuosis griseo-tomentellis; capitulis ca. 20-floris 7 mm. altis 6 mm. diametro; involuci campanulati squamis ca. 16, intimis linearis-oblongis obtusiusculis sed

acute mucronatis plerisque ca. 5 mm. longis; corollis viridescenti-flavidulis tubulosis gradatim paullulo sursum ampliatis 3.5 mm. longis; dentibus limbi 5 breviter deltoideis extus granulatis; antheris apice breviter crassiusculeque appendiculatis; styli ramis filiformibus paullo ad apicem incrassatis et nigrescentibus, achaeniis griseis 2.7 mm. longis deorsum crescentibus angulis hispidulis; pappi setis ca. 32 corollam subaequantibus albis vix barbellatis.—PERU: woods near a river, Caraz, Dept. Aneachs, alt. 2200 m., May 21, 1903, *Weberbauer*, no. 3027 (Berl., phot. and fragm. Gr.).

In many respects similar to *E. solidaginoides* HBK. but not as yet connected by intermediates and rather too different in appearance to be regarded as a variety until intergradation has been demonstrated. In *E. solidaginoides* the branches of the inflorescence present a somewhat racemose appearance, the heads being rather evenly distributed along them. In *E. flexile* this is not the case, the branches being floriferous chiefly toward the tip. In *E. solidaginoides* the heads are 10-15-flowered and the involucre (when fresh or softened by boiling) is rather narrowly campanulate, the scales being thin. In *E. flexile* the heads are about 20-flowered, the involucre broadly campanulate, and the scales somewhat firmer in texture. The achenes of *E. solidaginoides* are from 1.8-2.1 mm. long, while in *E. flexile* they are about 2.7 mm. long.

E. fuliginosum HBK. Nov. Gen et Spec. iv. 110 (1820); Robinson, Proc. Am. Acad. liv. 302 (1918). Of this little known Colombian species further material is now at hand extending its recorded distribution to the department of Huila, where these specimens were collected in forests on the Cordillera Oriental, east of Neiva, Aug. 1-8, 1917, by Drs. Rusby & Pennell, nos. 573 (N.Y.) and 977 (N.Y.). In all characters these correspond closely with a photograph (Gr.) of the type (Par.) and of their specific identity there can be no doubt. However, the receptacle bears a short, thin and very fugacious pubescence which commonly disappears so completely with the fall of the achenes as to leave the receptacle entirely glabrous and merely punctate, as it was described in the original diagnosis of the species. Technically, having a hairy receptacle, *E. fuliginosum* must be transferred to § *Hebeclinium*. In practice, however, it will be well to retain at least a cross-reference to it in § *Subimbricatum*, for the differential character from its obscurity and fugacious nature is here very likely to be overlooked. The labels of the material at hand record the plant as a tall shrub with greenish-yellow flowers.

E. (§ Subimbricata) Gascae, spec. nov., dense villoso-tomento-

sum, indumento brunneo vel fuscescenti patente glandularilongiusculo; caule (basi ignota) tereti 6 mm. crasso folioso medullosus; foliis oppositis petiolatis ovatis cordatis (sinu angusto) acutiusculis ca. 1 dm. longis 4-7 cm. latis supra atroviridibus conspicuiter bullato-rugosis puberulis subtus reticulatis sordido-tomentellis margine subregulariter dentatis, dentibus 1.5 mm. altis 3-4 mm. latis; petiolo 2-4 cm. longo dense piloso, pilis articulatis; corymbis terminalibus breviter pedunculatis densis 6-7 cm. diametro planiusculis vel modice convexis; capitulis ca. 22-floris 1.5 cm. longis 6 mm. crassis; involueri campanulato-subcylindrici squamis subtriseriatis ca. 21 ovatis acutis stramineo-viridibus costulato-striatulis dorso pubentibus, receptaculo plano; corollis graciliter tubulosis 5 mm. longis glabris paullulo sursum ampliatis; dentibus limbi 5 patentibus anguste deltoideis; achaenias graciliter prismaticis 4 mm. longis; pappi setis ca. 45 stramineo-albidis firmiusculo-capillaribus vix scabratibus.—PERU: Province of Chachapoyas, *Mathews* (TYPE, Gr.). The specimen at the Gray Herbarium bears no number, but an exact duplicate in the Kew Herbarium is marked "Mathews 1836. 91. H."

Though unusual to name plants for persons in no way connected with their discovery or investigation, the writer desires to perpetuate in the present interesting and attractive Peruvian species the memory of the extraordinary man, *Pedro de la Gasca* (born 1496, died 1569), styled by Charles V. the "President of the Royal Audience" and by the people of Peru "Father and Deliverer," concerning whom it may be said that he was the first Caucasian to reach Peru of whom the race has any reason to be proud.

E. (§ *Eximbricata*) *Gilbertii*, spec. nov., perenne vel fruticosum gracile glabriuscum; caule pallido-stramineo tereti ca. 2 mm. crasso flexuoso maturitate glaberrimo juventate sparse obscureque villosulo; foliis oppositis ovatis acutis vel leviter acuminatis mucronulato-serratis vel -crenatis (dentibus ca. 0.6 mm. altis inter se ca. 5 mm. distantibus) tenuibus membranaceis supra viridibus in nervis puberulis subtus distincte pallidioribus glabris 6-7 cm. longis 3-3.5 cm. latis basi rotundatis vel subcordatis integris; petiolo gracili ca. 1.7 cm. longo supra canaliculato puberulo; corymbis compositis planiusculis sublaxis obscure villosulis basi foliaceo-bracteatis; pedicellis filiformibus 4-10 mm. longis bracteolatis; capitulis parvis vix 5 mm. altis et diametro ca. 26-floris; involueri campanulati squamis ca. 17 subaequalibus oblongo-lanceolatis stramineo-viridibus saepius 2-costulatis et 3-veniis margine tenuibus subscariosis apice acutiusculis ciliatis dorso laxe pubescentibus (pilis tenuissimis fuscis non-glandulif-

eris); corollis albis ca. 3.3 mm. longis, tubo proprio glabro fauces campanulato-ampliatas subaequante, dentibus limbi hispidulis; achaenii (valde immaturis) 1.2 mm. longis ut videtur glabris; pappi setis ca. 20 albis sursum hispidulis.—PERU: San Miguel, Urubamba Valley, Dept. Cuzco, alt. about 1800 m., 7 June, 1915, *O. F. Cook & G. B. Gilbert*, no. 1115 (U. S., phot. Gr.).

E. (§ *Eximbricata*) *gloeoecladum*, spec. nov., fruticosum robustum vel arboreum; caulinis griseo-brunneis flexuosis teretibus juventate incurvo-puberulis glutinoso-viscosis tardius vix minute granulatis deinde omnino glabratris post exsiccationem longitudinaliter rugulosis usque ad 8 mm. diametro medullosis; medulla alba; internodiis 1–4 cm. longis; foliis ovato-oblongis argute acuminatis basi cuneatis 1–2 dm. longis 2.5–8 cm. latis integerrimis vel obsolete remoteque undulato-subdentatis penniveniis supra in nervo medio puberulis aliter glabris laevibus viridibus subtus pallidioribus reticulatis breviter denseque pubescentibus subcoriaceis; corymbis compositis valde convexis congestis ca. 1 dm. diametro a bracteis foliaceis plerumque superatis; pedicellis brevibus sordide pubescentibus; capitulis ca. 9-floris 8 mm. altis 4 mm. diametro; involucri campanulati squamis ca. 14 eroso-ciliatis dorso puberulis vel granulatis saepe aliquanto viscidulis vix imbricatis sed paucis extimis brevioribus et subgradatis; corollis verisimiliter albis vel roseis 5.5 mm. longis glabris paullo a basi ad limbum gradatim ampliatis; styli ramis vix clavellatis; achaenii ca. 2.5 mm. longis juventate in angulis glanduloso-granulatis tardius glabratris laevibus brunneis vel fuscis; pappi setis ca. 26 stramineo-albidis vix sebratis.—*E. trichotomum* Sch. Bip. Bull. Soc. Bot. Fr. xii. 81 (1865), & Linnaea, xxxiv. 535 (1865–66), without char., not Sch. Bip. in sched. Riedel ex Bak. in Mart. Fl. Bras. vi. pt. 2, 305 (1876).—BOLIVIA: Department La Paz, Province Larecaja, in the neighborhood of Sorata, in temperate region, 2700–3000 m., on Mt. Chilieca, near Challapampa, July–Sept. 1858, *G. Mandon*, no. 258 (Gr., N. Y.).

In giving this marked species what is believed to be its first description the author has duly considered the possibility of retaining the name *E. trichotomum* long ago applied to the plant by Schultz-Bipontinus. However, Schultz working in his usual rapid manner not only failed to give any diagnosis of this *E. trichotomum* but soon employed in manuscript the same binomial for a wholly different plant. *E. trichotomum* Sch. Bip. in the latter sense has seen light and received a certain amount of definition in Mart. Fl. Bras. vi. pt. 2, 305 (1876) where established by Baker as a variety of *E. Vauthierianum*

DC. Under these circumstances it appears unwise to describe a *Eupatorium trichotomum* Sch. Bip. in another sense. Therefore, an entirely new name is here chosen.

E. (§ *Subimbricata*) *gracile*, spec. nov., herbaceum perenne gracile 3-4 dm. vel ultra altum; radice e fibris paucis gracilibus lignescensibus elongatis sistente; caulis solitarius vel pluribus terribus purpurascensibus sordide puberulis vel tomentellis; foliis oppositis detoideo-ovatis acutis vel acuminatis crenato-dentatis basi rotundatis vel truncatis vel subcordatis integris 1.8-3 cm. longis 1.1-2.3 cm. latis tenuibus membranaceis supra pubescentibus subtus griseo-tomentosis ima a basi 3-nervatis; petiolo tenui 4-8 mm. longo griseo-pubescente; capitulis ca. 25-floris 6 mm. longis 3.7 mm. diametro in cymos laxos 1-4-capitulatos ad apices ramorum patentium gestis in paniculam laxam foliaceo-bracteataam dispositis; involueri anguste campanulati squamis ca. 19 subtriseriatis stramineis, interioribus lanceolato-ellipticis obtusis laeviusculis 2-3-costulatis scarioso-marginatis, intermediis et extimis gradatim brevioribus ovato-lanceolatis acutis vel acuminatis brunneo-puberulis; corollis verisimiliter albis limbo excepto glabris; tubo proprio 0.7 mm. longo fauibus paullo ampliatis cylindricis 2.3 mm. longis; achaeniis 1.5 mm. longis fusco-brunneis, costis paullo pallidioribus hispidulis; pappi setis ca. 27 delicatule capillaribus sublaevibus albis.—**PERU:** without locality, Mathews (N. Y., phot. Gr.).

E. (§ *Subimbricata*) *hylophilum*, spec. nov., herbaceum ut videtur erectum obscure praecipue in novellis pulverulenti-puberulum; caule tereti flexuoso folioso pallide griseo-brunneo; foliis oppositis anguste lanceolatis utroque attenuatis peracutis subsessilibus remote denticulatis (dentibus 0.5-0.7 mm. altis inter sese ca. 1 cm. distantibus) supra glaberrimis viridibus subtus distincte pallidioribus nervo medio obsolete puberulis penniveniis (venis intra marginem anastomosantibus) ca. 1 dm. longis 1 cm. latis tenuiter membranaceis; panicula terminali ovoidea subthyroidea; ramulis pedicellisque fere filiformibus incurvato-puberulis; capitulis 5-6 mm. altis 2.6 mm. diametro ca. 21-floris; involueri squamis ca. 25, 3-4-seriatis gradatis stramineis tenuibus striatulis apicem versus griseo-tomentellis; corollis albis glabris graciliter tubulosis 3 mm. longis paullulo apicem versus ampliatis, dentibus limbi 5 deltoideis dorso granulatis; styli ramis cum appendice filiformi flexuosa papillato-puberula munitis; achaeniis 1.3 mm. longis nigris in angulis pallidioribus parce hispidulis; pappi setis capillaribus albis vix seabratis ca. 28 mm. longis.—**COLOMBIA:** forest, alt. 150-300 m., Boca Esmeralda, on Rio Sinu, Dept. Bolívar,

1 Mar. 1918, *Dr. F. W. Pennell*, no. 4561 (N. Y., phot. and fragm. Gr.).

This species with something of the habit of a *Solidago* is clearly of the affinity of *E. elatum* Steetz, *E. turbacense* Hieron., *E. Squiresii* Rusby, and *E. torarensis* Robinson. From all these it differs in its much narrower, much more gradually attenuate, and in texture more delicate leaves of somewhat different venation and essentially glabrous beneath. In style-branches and some other features it recalls *E. Trianae* Robinson but differs in its opposite leaves, slender-pedicelled heads, etc.

E. (§ *Subimbricata*) *hypargyrum*, spec. nov., fruticosum; ramis curvato-ascendentibus juventate subadpresso-lanatis tardius glabratis brunneo-griseis cum lenticellis munitis; foliis oppositis petiolatis rhomboideo-ovatis falcato-acuminatis basi cuneatis obscure remoteque cuspidato-serrulatis supra glabris viridibus subitus acete lepidoto- vel pannoso-lanatis argyreis penniveniis (venarum jugis 1-2 paullo supra basin aliis multo longioribus, omnibus subglabris sursum incurvatis anastomosantibus) submembranaceis usque ad 1 dm. longis et 3.8 cm. latis; petiolo 1-1.6 cm. longo; corymbo terminali composito ca. 1 dm. diametro convexo multicapitulato; capitulis ca. 9-floris ca. 1 cm. longis 3.8 mm. diametro; involuci subcylindrico-campanulati squamis 3-seriatis ovato-lanceolatis vel anguste oblongis acutiusculis obscure 3-nervatis arachnoideo-ciliatis aliter subglabris viridibus saepius purpureo-tinctis; corollis laete purpureis glabris subcylindricis 6 mm. longis paullo sursum ampliatis sine faucibus distinctis; achaenii (valde immaturis) 2.7 mm. longis granulatis; pappi setis ca. 28 laete stramineo-albis basin versus paullo incrassatis corollam subaequantibus vix scabratiss.—**ECUADOR:** vicinity of Azogues, 16-17 Sept. 1918, *J. N. & G. Rose*, no. 22,774 (Gr., U. S., N. Y.). Not closely related to any hitherto described Ecuadorian species. The lower surface of the leaves is closely covered with a somewhat lepidote pubescence except the midnerve and chief veins which are essentially bare. In habit and foliage the species recalls several *Eupatoriums* of Peru and Bolivia, but these are of § *Eximbricata* rather than § *Subimbricata* to which the present species is clearly referable.

E. (§ *Eximbricata*) *iodotrichum*, spec. nov., herbaceum perenne ca. 8 dm. altum; caule tereti erecto vel paullo decumbente supra medium partem oppositirameo atropurpureo villosulo, pilis aliis delicatulis attenuatis purpureo-articulatis aliis (plerumque in parte superiore) rectis divaricatim patentibus purpureis glanduloso-capitatis;

internodiis 4-11 cm. longis; foliis deltoideo- vel subreniformi-ovatis brevissime acuminatis cordatis grosse dentatis (dentibus utroque 5-7 vix acutis 1-1.8 mm. altis 3-4 mm. latis) a basi 3(-5)-nerviis utrinque sparse pubescentibus viridibus subtus paullo pallidioribus 2-2.5 cm. longis 2.5-2.8 cm. latis; petiolo ca. 1 cm. longo pubescente; cymis plerisque 3-capitulatis ramos graciles curvato-adscendentes folioso-bracteatos terminantibus laxis; pedicellis 1-1.5 cm. longis filiformibus dense cum glandulis stipitatis instructis; capitulis ca. 46-floris 1 cm. altis et crassis; involueri campanulati squamis ca. 20 ca. 6 mm. longis lanceolato-linearibus subaequalibus attenuatis glandulari-puberulis saepissime atropurpureis basin versus plerisque 2-costulatis; corollis 5-5.5 mm. longis ut videtur albis limbo hispidis aliter glabris; tubo proprio ca. 2.5 mm. longo, fauibus distinete ampliatis subcylindricis ca. 2.8 mm. longis; achaenii (immaturis) ca. 2.5 mm. longis fuscescentibus in angulis sursum hispidulis; pappi setis ca. 17 caducis pulcherrime roseis corollam subaequantibus.—
ECUADOR: vicinity of Cañar, 15-16 Sept., 1918, J. N. & G. Rosé, no. 22,766 (Gr., U. S., N. Y.). Clearly of the affinity of *E. gracile* HBK., *E. prunellaefolium* HBK. etc., but characterized by leaves which are broader than long and rather deeply cordate.

E. IRESINOIDES HBK. Nov. Gen. et Spec. iv. 106, t. 340 (1820); Robinson, Proc. Am. Acad. liv. 285, 338 (1918), where vars. *villosum* Steetz, *glabrescens* Steetz, and *breviflorum* Hieron. are distinguished. Of this always characteristic yet somewhat polymorphous species it is now possible to add another variety as follows:

Var. **adenotrichum**, var. nov., habitu foliisque fere ut apud var. *villosum* differt tamen ramulis pedicellisque inflorescentiae glandulari-puberulis; capitulis paullo minoribus ca. 5.3 mm. longis; involueri squamis numerosioribus ca. 22 omnibus peracutis vel attenuatis.—COLOMBIA: in a ravine, alt. 700-1500 m., Cordillera Oriental, east of Neiva, Dept. Huila, Rusby & Pennell, no. 480 (N. Y., Gr.).

It is, of course, impossible to say whether the glandular indumentum will prove to be regularly correlated with the slightly smaller heads and more numerous and sharper-pointed scales or whether these features will be found to have independent variability. However, the combination present in the material at hand seems to warrant varietal rather than formal distinction.

E. (§ Eximbricata) isillumense, spec. nov., fruticosum gracile subscandens exsiccatione nigrescens petiolis basique nervorum puberulis exceptis glaberrimum; caulibus teretibus 2.5 mm. diametro pallide brunneis, internodiis 3-8 cm. longis; foliis oppositis ovato-

oblongis (supremis lanceolatis) acuminatis basi levissime cordatis mucronato-serratis (serraturis vix 1 mm. altis 6-8 mm. latis) tenuibus a basi 3-5-nerviis (nervis inter sese a venis transversis connexis) 10-12 cm. longis 3-4.5 cm. latis; petiolo brevi gracile viscidulo-tomentello 4-6 mm. longo; panicula oppositiramea laxa ovoidea basi vel saepe ad medianam partem foliaceo-bracteata; pedicellis filiformibus glabris saepe cum bracteolis squamiformibus solitariis instructis 8-15 mm. longis; capitulis ca. 52-floris 7 mm. altis 9 mm. diametro; involucri late campanulati squamis ca. 30 (1-3 extimis brevioribus exceptis) subaequalibus linearibus acutissimis glabris obscure 1-3-nervatis; corollis 3 mm. longis albis vix sursum gradatim ampliatis glabris; antheris apice cum appendice ovata integra munitis; achaeniis (immaturis) ca. 2 mm. longis ut videtur glabris; pappi setis ca. 28 tenuibus albis sublaevibus.—PERU: in woods near the tambo Isilluma between Sandia and Chunchusnago, alt. 1000 m., 23 June, 1902, Weberbauer, no. 1206 (Berl., phot. and fragm. Gr.).

In habit and foliage recalling the Brazilian *E. laere* DC. but readily distinguished by its much looser inflorescence, puberulent petioles, leaves nerved from the very base, more numerous florets, etc.

E. (§ *Eximbricata*) *lobatum*, spec. nov., herbaceum perenne pluricaule decumbens 1-4 dm. altum; caulis teretibus viridibus vel fuscenscentibus flexuosis simplicibus vel oppositirameis foliosis, internodiis 1-2 cm. longis; foliis oppositis graciliter petiolatis in axillis saepe proliferis, laminis ovatis 1-2 cm. longis fere aequilatis profunditer crenato-lobatis vel inferioribus etiam subpinnatim 3-foliolatis utrinque viridibus et pilosulis subitus vix pallidioribus, lobis 5-9 integris vel crenato-lobatis apice obtusissimis vel rotundatis, petiolo 5-15 mm. longo; capitulis mediocritibus solitariis et terminalibus vel in corymbis parvis paucicapituliferis erectis vel saepius nutantibus, pedicellis 3-10 mm. longis gracilibus tomentellis; involucro campanulato 8-11 mm. diametro multiflosculo, squamis 1-2-seriatim imbricatis subaequalibus oblanceolati-oblongis subherbaceis acutis vel obtusis viridibus vel apice scarioso-purpurascensibus 6-8 mm. longis; corollis verisimiliter albis externe granulosis 4-5 mm. longis, tubo proprio gracili fauibus cylindricis breviori, dentibus limbi brevissimis suberectis; achaeniis gracilibus griseo-brunneis fere ab apice ad basin gradatim angustatis basi substipitatis in costis pulcherrime ciliolatis; pappi setis albis tenuissimis fragilibus 3-4 mm. longis.—*E. scopulorum* Sch. Bip. Bull. Soc. Bot. France, xii. 82 (1865) & Linnaea, xxxiv. 535 (1865-6); Rusby, Bull. N. Y. Bot. Gard. iv. 378 (1907); not Wedd.—BOLIVIA: on cliffs in the subalpine region, near

Yani, Prov. Larecaja, alt. 3500 m., *Mandon*, n. 263 (Gr., N. Y.); without exact locality, *Bang*, no. 1912 (Gr., N. Y., U. S.). Both specimens distributed as *E. scopulorum*. It is quite impossible to believe that this plant, with very characteristic, deeply lobed or even divided leaves, is conspecific with the plant which Weddell, *Chlor. And.* i. 216 (1857), described and illustrated as having serrate leaves.

E. (§ *Cylindrocephala*) *mallotum*, spec. nov., lignescens verisimiliter elatum et subscandens molliter tomentosum vel tomentellum, pilis densis brevibus incurvis; caule tereti oppositirameo; foliis oppositis deltoideo-ovatis acuminatis integris basi rotundatis vel subtruncatis vel etiam paulo cordatis 2-3.5 cm. longis 1.4-2.7 cm. latis ima a basi 3-nerviis supra griseo-tomentellis subtus canescenti-tomentosis; petiolo dense tomentoso 3-5 mm. longo; capitulis 13 mm. longis 8 mm. diametro ca. 30-floris numerosis corymbo composito planiusculo terminali dispositis; pedicellis 6-20 mm. longis; involuci maturitate cylindrici squamis 5-6-seriatis arcte imbricatis apice rotundatis ciliolatis, extimis ovatis dorso tomentosis, ceteris dorso glabriusculis saepe apicem versus fuscescentibus vel viridimaculatis; corollis verisimiliter violascentibus glabris, 6 mm. longis paulo gradatim sursum ampliatis; achaeniis gracilibus deorsum decrescentibus 5.2 mm. longis, faciebus nigris glabris, angulis pallidis sursum hispidulis; pappi setis sordide albis inaequalibus scabridis vix sursum incrassatis.—*E. Clematitis*, var. *tomentosum* Sch. Bip. *Bull. Soc. Bot. Fr.* xii. 81 (1865), without char., & *Linnaea*, xxxiv. 535 (1865-66), as *Clematidis* var. *tomentosa* and also without char. *E. conyzoides*, var. *incanum* Britton, *Bull. Torr. Bot. Club*, xviii. 333 (1891), and probably of Baker in *Mart. Fl. Bras.* vi. pt. 2, 278 (1876).—**BOLIVIA**: Dept. LaPaz, Prov. Larecaja: "viciniis Sorata; inter Munaypata et rivum Chalassayo, in schistosis. Reg. temp. 2600-2700 m.", *Mandon*, no. 249 (TYPE, Gr., N. Y.); Sorata, alt. 2440 m., *Rusby*, no. 1626 (N. Y.); Prov. Yungas, alt. 1220, *Rusby*, no. 1625 (N. Y.).

From the expression "*an spec.?*" appended to his identification Schultz seems to have surmised the probable distinctness of this plant, though provisionally treating it as a variety of *E. clematitis* DC. The latter, a rare and little known Peruvian species, founded upon Poeppig's no. 3108 (of which a small and poor fragment from the herbarium of the late F. W. Klatt is now in the Gray Herbarium), has narrowly triangular to lance-oblong thinnish and essentially glabrous leaves, much longer and more slender petioles, and a more elongated and looser inflorescence. Prof. Britton, l. c., is very likely

right in identifying the Bolivian plant with Baker's inadequately characterized *E. conyzoides* Vahl, var. *icanum* of Brazil. However, as has been shown elsewhere, *E. conyzoides* Vahl (as well as the much earlier *E. conyzoides* Mill.) drops definitely into the synonymy of *E. odoratum* L., a plant with smaller heads, paler involucral scales, more rhombic-ovate leaves of much greater size and less pubescence, longer petioles, etc. Of the varietal names, neither *tomentosum* nor *icanum* is satisfactorily available for use in the specific rank because of earlier homonyms of possible validity. Accordingly it seems best to give this doubtful plant a new start as an independent species under a fresh name.

Var. ? *aporum*, var. nov., foliis lanceolato-ovatis gradatim acuminatis basi rotundatis supra densiusculae puberulis subtus pallidioribus griseo-tomentellis usque ad 5.2 cm. longis et 2.4 cm. latis; petiolo fere 1 cm. longo; aliter ut apud var. *typicum* supra descriptum.—BOLIVIA WITHOUT LOCALITY: Bang, no. 2875 (Gr., U. S.). This plant with its tomentellous round-based leaves and rather dense inflorescence cannot be satisfactorily placed in the Peruvian *E. clematitis* DC. (under which name it was distributed). Its fine and rather copious pubescence keeps it also from being placed in the nearly related *E. subscandens* Hieron. It is obviously close to the species just described as *E. malloatum*, but while the several collections of that plant already secured have consistently the small deltoid-ovate very short-petioled leaves which give the species a highly characteristic appearance, this possible variety differs considerably in the form and dimensions of the leaf-blade and in having decidedly longer petioles, in these regards showing an approach to *E. subscandens*. Until much more copious material is available to show the direction and extent of its variability, the plant must remain uncertain and for the present it seems best to give it the provisional classification above indicated.

E. (§ *Subimbricata*) *Mathewsi*, spec. nov., fulvo-tomentosum perenne verisimiliter fruticosum basi ignotum; caulibus ramisve curvato-adscendentibus teretibus foliosis 4 mm. diametro post excisionem paullulo costulatis; internodiis 3-6 cm. longis; foliis oppositis lanceolatis utroque attenuato-acuminatis caudatis remote cuspidato-serratis (dentibus acutis 1-2 mm. longis ca. 1.5 cm. distantibus) penniveniis supra lucidulis cum venuulis depresso reticulatis in nervo medio pubescentibus aliter subglabris subtus rufescenti-pubescentibus leviter reticulatis ca. 1 cm. longis 2 cm. latis; petiolo 1-1.5 cm. longo; panicula oppositiramea pyramidata ca. 1.5 dm.

alta et diametro foliaceo-bracteata; pedicellis 3-7 mm. longis fulvo-tomentosis; capitulis ad apices ramorum subdense dispositis ca. 56-floris ca. 9 mm. altis et crassis; involueri campanulati squamis subtriseriatim imbricatis paullo gradatis ovato-lanceolatis costulatis purpureo-tinctis glanduloso-ciliolatis et dorso sparse tomentellis; receptaculo plano glabro; corollis 5.5 mm. longis sensim sursum ampliatis extus limbum versus paululo granulatis; styli ramis clavel-lati-filiformibus; achaenii pallide griseis 2.3 mm. longis plerisque basi curvata callosis; pappi setis ca. 25 laete albis 3.5 mm. longis corolla conspicue brevioribus.—PERU: Yambrasbamba, 1835, *Matheus*, no. 1386 (K., phot. Gr.).

E. (§ *Conoclinium*) *metense*, spec. nov., herbaceum erectum oppositirameum breviter tomentosum saltim 6 dm. altum (basi ignota); caule ramisque adscendentibus teretibus leviter multi-costulatis; internodiis usque ad 7 cm. longis; indumento denso primo griseo tardius fusco-brunneo; foliis oppositis ovato-oblongis obtusis grosse crenatis saepius deflexis et conduplicatis 3-6 cm. longis 1.5-3 cm. latis basi abrupte angustatis supra griseo-viridibus tomentellis subtus pallidioribus griseo-tomentosis a basi 3-nerviis, venis laxe anastomosantibus; petiolo 2-6 mm. longo; corymbis ramos terminantibus irregulariter compositis densiusculis convexis; capitulis breviter pedicellatis 6.5 mm. altis 4.5 mm. diametro ca. 28-floris; involueri campanulati squamis ca. 20 subaequalibus leviter imbricatis oblongo-lanceolatis acutis pallide viridibus plerisque 2-costulatis et 3-nerviis dorso griseo-hirsutulis; corollis laete roseo-purpureis glabris 3.7 mm. longis supra medianam partem paullo in fauces indistinctas ampliatis; dentibus patenti-recurvatis; styli ramis longe exsertis vix incrassatis 3.5 mm. longis; achaenii nigris glabris 1.7 mm. longis; pappi setis albis minute barbellatis 3 mm. longis basi in annulum paullo connatis.—COLOMBIA: grassy llano east of Villavicencio, Intendencia Meta, 1-2 Sept. 1917, Dr. F. W. Pennell, no. 1617 (N. Y., phot. and fragm. Gr.).

This species has so closely the habit and involucre of § *Conoclinium* that it seems best to place it there provisionally, although the receptacle is only moderately convex, considerably less so than is usual in the section. Among the Colombian Eupatoriums of § *Conoclinium* this new species approaches most nearly *E. ballotaefolium* HBK., but differs from it in its strictly opposite short-petioled leaves of oblong rather than deltoid-ovate contour and of considerably firmer texture.

E. (§ *Subimbricata*) *orgyaloides*, spec. nov., verisimiliter fruticosum (basi ignota) petiolis et ramis inflorescentiae obscure puber-

ulum aliter glaberrimum; caulis ut videtur erectis gracilibus paullo (post exsiccationem) costato-angulatis fusco-brunneis ad inflorescentiam foliosis; internodiis 4-5 cm. longis; foliis oppositis petiolatis lanceolato-oblongis utroque acuminatis paullo undulatis obscure remoteque cuspido-denticulatis penniveniis (venis principibus utroque 4-6 prorsus curvatis) chartaceo-membranaceis supra atroviridibus sublucidis subtus paullo pallidioribus opacis utrinque glabris delicatule reticulato-venosis, maximis 1.6 dm. longis 6 cm. latis, petiolo supra canaliculato brevissime fusco-puberulo 4-7 mm. longo; panicula breviter lateque pyramidata 11 cm. alta 17 cm. diametro oppositiramea basi foliaceo-bracteata; ramis gracilibus divaricatim patentibus apicem versus solum capituliferis; capitulis ca. 20-floris 4.5 mm. altis et crassis brevissime pedicellatis subcongestis; involuci campanulati squamis ca. 21 fusco-vel viridistramineis ciliolatis aliter glabris modice gradatis, interioribus oblongis vel linearibus, extimis ovatis acuminatis 5-costulatis apice saepe recurvatis; corollis 2.5 mm. longis paullo sursum gradatim ampliatis glabris, dentibus limbi recurvantibus; achaeniis (immaturis) glabris 1.7 mm. longis; pappi setis ca. 30 vix scabratiss 2 mm. longis.—PERU: Depart. Loreto, near Tarapoto, *Spruce*, no. 4546 (K., phot. Gr.). In habit recalling *E. orgyale* DC. of eastern Brazil, which however has pubescent conspicuously dentate leaves, 6-12-flowered heads, and other differences.

E. (§ Subimbricata) *Pachanoi*, spec. nov., suffruticosum 3 dm. vel ultra altum ramosissimum; caulis teretibus plus minusve flexuosis basin versus delapsu foliorum nudatis nodulosis juventate cum indumento brevi lanuginoso griseo-fulvescente obtectis; ramis gracilibus saepissime oppositis curvato-adscendentibus foliosissimis, internodiis 3-12 mm. longis; foliis ovato-lanceolatis acutiusculis basi obtusis vel rotundatis supra medianam partem serratis (dentibus utroque 3-4) supra subaveniis obscure praecipue in nervo medio puberulis subtus vix pallidioribus laete viridibus punctatis glabris supra basin 3-nerviis 1.5-2.2 cm. longis 7-10 mm. latis; corymbis pluribus ca. 3 cm. diametro valde convexis subovoideis ramulos terminantibus a ramis foliiferis superatis; pedicellis 4-8 mm. longis fulvescenti-pubescentibus bracteolatis; capitulis ca. 10-floris 8 mm. altis 5 mm. diametro; involuci campanulati ca. 3-seriati laxe imbricatis squamis ca. 13 viridibus vel purpureo-tinctis ciliatis dorso pubescentibus et glanduliferis, extimis brevibus ovatis vel lanceolato-oblongis vix acutis, intermediis late spatulato-ovatis apice rotundatis, intimis lineari-oblongis; corollis ut videtur purpureis 4.3 mm. longis supra

basin paullo constrictis aliter subcylindricis, usque ad medianam partem et in limbo extus atomiferis; achaeniis 2 mm. longis brunneo-fuscis deorsum decrescentibus in faciebus et in costis cum glandulis globosis sessilibus conspersis; pappi setis ca. 35 inaequalibus patenter barbellatis.—*ECUADOR*: vicinity of Nabón, Prov. of Azuay, Sept. 25, 26, 1918, *Dr. J. N. Rose, A. Pachano, & George Rose*, no. 22,978 (Gr., U. S., N. Y.).

A well-marked species, in its habit and small ovate-lanceolate leaves recalling several species of *Vaccinium*. From *E. vaccinacefolium* Benth. of Colombia it differs in having longer internodes, membranaceous leaves, broader, blunter, and much more pubescent involucral scales, and more numerous florets. From *E. umbrosum* Benth. it differs in having considerably smaller ovate-lanceolate rather than elliptical leaves, which are fewer-toothed, and also in having a more imbricated involucre.

***E. (§ Hebeclinium) phoenicticum*, spec. nov.**, herbaceum ut videtur erectum oppositirameum; caulis ramisque teretibus dense lanato-tomentosis; indumento primo pulchriter purpureo deinde brunneo vel griseo; internodis 1–1.5 dm. longis; foliis majusculis oppositis ovatis vel (superioribus) lanceolatis acuminatis basi breviter cuneatis margine leviter obtuseque serratis penniveniis (venis lateribus principibus utroque 3–4) supra scaberrimis dense papilloso-pubentibus subtus molliter fulvo-lanuginosis 7–14 cm. longis 3.5–7.5 cm. latis; petiolo 1–3.4 cm. longo tomentoso; corymbis terminalibus di- vel trichotomis densis; ramis curvato-ascendingentibus; capitulis numerosis congestis sessilibus 5–6 mm. longis ca. 13-floris: involuci ovoideo-subcylindrici squamis ca. 25, 3–5-seriatis regulariter gradatis ovatis vel oblongo-lanceolatis obscure ciliolatis aliter glabris 1–3-nerviis purpureo-tinctis; receptaculo planiusculo vel leviter convexo longe piloso; corollis roseis graciliter tubulosis vix sursum ampliatis 4 mm. longis glabris; styli ramis filiformibus flexuoso-recurvatis; achaeniis glabris 1.7 mm. longis (vix maturis); pappi setis ca. 36 laevibus vel vix barbellatis apicem versus paullulo incrassatis plerisque corollam subaequantibus albidis.—*COLOMBIA*: herb in field, alt. 2200–2600 m., Murillo, Dept. Tolima, 18 Dec., 1917, *Dr. F. W. Pennell*, no. 3159 (N. Y., Gr.).

This species in habit and inflorescence rather closely resembles *E. fuliginosum* HBK., but differs from it in the serrate (not mucronate-denticulate) leaves, which have fewer lateral veins; also in having its involucral scales (which are purple rather than fuscous) glabrous except for an obscure ciliation. It is also related to *E. sericeum* HBK.,

which, however, has white woolly stems and petioles, and broader as well as more caudate-acuminate leaves, which are 3-nerved from above the base rather than feather-veined.

E. *PSEUDO-DALEA* (DC.) Gomez & Molt. Ann. Hist. Nat. Madrid. xix. 272 (1890). *Critonia pseudo-dalea* DC. Prod. v. 140 (1836). Recent material, agreeing with this species in all essential characters of habit, inflorescence, florets, and achenes, as well as in the toothing, venation, and punctuation of the leaves, still exhibits such marked differences in the rounded leaf-base closely sessile upon the stem as to present a decidedly exceptional appearance when compared with typical specimens. There is also a tendency on the part of some material now available to have much more coarsely toothed leaves than the type. To provide appropriate classification for these variations the following varieties may be proposed.

Var. *typicum*, foliis breviter serrato-dentatis (dentibus 0.6–0.9 mm. altis 3–5 mm. latis) basi cuneatis; petiolo 6–8 mm. longo.—CUBA: *Ramon de la Sagra* (Gr.); in crevices of rocks at the Farallones, *Wright*, no. 1311 in part (Gr.).

Var. *apodophyllum*, var. nov., foliis breviter serrato-dentatis (dentibus ut apud var. *typicum*) basin versus angustatis sed ima basi rotundatis arte sessilibus vel cum petiolo brevissimo 1–2 mm. longo munitis.—CUBA: base of coastal cliffs near Rio Yamuri, Oriente, 6, 8 Dec. 1910, *J. A. Shafer*, no. 783 (TYPE, Gr., N. Y.); margin of rivulets near Pinar del Rio, 3 Dec. 1860–1864, *Wright*, no. 1311 in part (Gr.).

The plant of Shafer has sessile leaves, that of Wright has leaves of closely similar form, but very shortly petioled (petioles 1–2 mm. long).

Var. *macrodontum*, var. nov., foliis argute serrato-dentatis, dentibus 2–4 mm. altis 4–6 mm. latis acuminatis; lamina basi cuneata; petiolo 1.4–2.5 cm. longo.—CUBA: Guajaibon, 4 Nov. 1860–1864, *Wright*, no. 2812 (TYPE, Gr.), limestone cliff, Baños San Vicente, Prov. Pinar del Rio, 12–16 Sept. 1910, *N. L. & E. G. Britton & C. S. Gager*, no. 7451 (Gr.).

E. (§ *Eximbricata*) *psilodorum*, spec. nov., aspectu primo glayer-rimum solis in petiolis pedicellisque obscure puberulum herbaceum perenne vel fruticosum (basi ignota); caule tereti laevissimo flavidoviridi erecto folioso superne paniculatim ramoso; foliis oppositis lanceolato-ovatis longe acuminatis saepe falcatis argute serratis (dentibus ca. 1 mm. altis ca. 3–4 mm. latis incurvis) basi rotundatis aliquando obliquis utrinque glaberrimis flavidoviridibus a basi vel paulo supra basin 3–5-nerviis impunctatis 6.5–7.5 cm. longis 2–3 cm.

latis; petiolo gracili vix supra villosulo ca. 2 cm. longo; corymbis compositis terminalibus trifidis laxiusculis inferne foliaceo-bracteatis; pedicellis 8–15 mm. longis cum bracteolis 1–3 filiformibus instructis; capitulus ca. 22-floris 6–7 mm. altis 5 mm. diametro plerisque erectis; involucri campanulati squamis ca. 18 linearibus acutis glabriusculis substramineo-herbaceis apicem versus scariosis et fimbriato-ciliatis subaequalibus; corollis albis ca. 3.5 mm. longis glabris; tubo proprio ca. 1.5 mm. longo fauces campanulato-cylindricas aequante, limbi dentibus 5 ovato-deltoides ca. 0.5 mm. longis; achaeniis 2 mm. longis maturitate nigris in angulis hispidulis; pappi setis 18–25 delicatulis albis scabridulis ca. 2.8 mm. longis fragilissimis.—*E. Dombeyanum* Robinson, Proc. Am. Acad. liv. 315 (1918), not DC.—COLOMBIA: in clearings, not common, Las Nubes near Santa Marta, Dept. Magdalena, alt. 1372 m., *Herbert H. Smith*, no. 621 (Gr., U. S., N. Y., Mo.).

The real *E. Dombeyanum* DC. (see p. 11) is probably a Peruvian plant, with roseate or purplish corollas. Its leaves, while of similar form, have decidedly more salient teeth and relatively shorter petioles. These in *E. Dombeyanum* are about one-eighth as long as the blade, while in *E. psilodorum* they are more than one-fourth its length. To *E. psilodorum* may be referred with scarcely a doubt also Dr. Pennell's no. 3190 from Murillo, Dept. Tolima.

E. (§ *Eximbricata*) *rhypodes*, spec. nov., herbaceum erectum 4–5 dm. altum virgatum vel superne mediocriter ramosum; caule tereti densissime glanduloso-tomentoso; pilis patentibus atropurpureis glandulari-capitulatis; internodiis 1.5–9 cm. longis, nodis paullo incrassatis; foliis oppositis vel ternatis membranaceis suborbiculari-ovatis breviter acuminatis serrato-crenatis (dentibus utroque 5–8 ca. 1 mm. altis 3 mm. latis) basi cordatis supra pubescens subitus dense villosis 2–4 cm. longis et latis, petiolo 7–10 mm. longo densissime glanduloso-tomentoso; panicula terminali plerumque trichotoma 5–9 cm. diametro planiuscula maturitate modice laxa; ramis et pedicellis (8–14 mm. longis) dense tomentosis; pilis atropurpureis aliis attenuatis articulatis aliis glandulari-capitulatis; capitulis ca. 45-floris 7–8 mm. altis et diametro; involucri campanulati squamis subaequalibus anguste lanceolati-oblongis acutis usque ad medianam partem plerisque 2-costulatis viridibus vel purpureo-tinctis cum pilis purpureis (aliis capitatis aliis attenuatis articulatis) sparsis; corollis albis 3.6–3.8 mm. longis; tubo proprio gracili 1.5 mm. longo; faucibus campanulato-cylindricis ca. 2.5 mm. longis, limbo patenter villoso 0.6 mm. longo; achaeniis nigris gracilibus 2.7 mm. longis ad apicem et ad basin paullo attenuatis praecipue in angulis

sursum hispidis basi callosis apice cum disco parvo flavescente pappi-fero coronatis; pappi setis albis roseo-tinetis sursum scabridulis apicem versus paullulo incrassatis.—ECUADOR: vicinity of Las Juntas, *J. N. Rose, A. Pachano, & G. Rose*, no. 23,179 (Gr., U. S., N. Y.).

This plant differs from *E. pichinchense* HBK. in its copiously gland-tipped pubescence, much smaller, fewer-toothed leaves, etc. From *E. glanduliferum* Hieron. it may be distinguished by having the leaves petiolate and their blades essentially as wide as long. In many respects it corresponds pretty closely with the Colombian *E. sotarense* Hieron., but that species, according to Hieronymus, has leaves glabrescent or subglabrescent (while they are here densely and permanently pubescent to villous on both surfaces), rounded at the base (while here distinctly cordate), and longer than wide.

E. RORULENTUM Robinson, Proc. Am. Acad. liv. 255 (1918). This species, described from young material with the heads merely in bud, has been collected near Laguna de Verjón, Colombia, by Bro. Aristé-Joseph, no. B20 (Gr.). From this material, which, agreeing as to habit and foliage in all details with the original, is decidedly more mature, it is possible to add the following characters to those recorded in the diagnosis: heads at length 8–9 mm. high; corolla whitish 5 mm. long, sparsely atomiferous, proper tube 1 mm. long, the throat about 3.4 mm. long, the limb about 0.6 mm. long, the teeth deltoid, acutish; mature achenes dark brown, about 3 mm. long.

E. (§ *Cylindrocephala*) *Roseorum*, spec. nov., brevissime griseo-tomentellum; caule tereti usque ad 4 mm. vel ultra diametro pilis albis minutis curvatis eglandularibus tecto; internodiis ad 6 cm. longis; foliis oppositis saepe in axillis proliferis deltoideo-ovatis acute acuminatis basi subtruncatis paullo crenato-serratis vel undulatis vel integris a basi 3-nervatis plerisque ca. 5 cm. longis 3.5 cm. latis membranaceis subconcoloribus vix subtus pallidioribus utrinque tomentellis; petiolo gracile flexuoso 10–18 mm. longo; corymbis modice convexis ramos oppositos vel supra alternos terminantibus multicapitulatis densiusculis conjunctim paniculam semiglobosam vel ovoideam foliaceo-bracteatum formantibus; pedicellis plerisque ca. 5 mm. longis; capitulis ca. 17-floris 1.5 cm. longis 4 mm. latis; involueri cylindrici squamis ca. 30 gradatim regulariterque imbricatis ciliolatis; extimus brevissime oblongis apice rotundatis dorso puberulis et sparsim atomiferis subherbaceis; intermediis et intimis gradatim longioribus ciliatis aliter glabriusculis obtusis vel (intimis) acutiusculis albis pulcherrime lilaceo-tinetis

3(-1)-viridi-nerviis; corollis glabris gracilibus ca. 5 mm. longis a basi ad limbum paullo gradatimque ampliatis; achaenii graciliter subprismaticis basin versus paullo attenuatis griseo-fuscis adpresso in angulis et faciebus puberulis; pappi setis ca. 28 seabbratis delicatulis albis ca. 4 mm. longis.— ECUADOR: vicinity of Guayaquil, 30 August to 2 Sept., 1918, J. N. & G. Rose, no. 22,464 (Gr., U. S., N. Y.). A handsome species with deltoid-ovate leaves recalling those of *E. irresinoides* HBK. but with involucre characteristic of § *Cylindrocephala*. The involucral scales (green, white, and lilac) recall those of *E. iridolepis* Robinson. An attractive and seemingly very distinct species which it is a pleasure to dedicate to Dr. J. N. Rose of the United States National Museum and to his son, who was his assistant on a recent collecting trip to Ecuador.

E. (§ Subimbricata) roupalifolium, spec. nov., robustum verisimiliter fruticosum; caule (vel ramo) ca. 5 mm. crasso medulloso purpureo-brunneo glaberrimo lucidulo; internodiis 1-2.5 em. longis; foliis oppositis ovato-oblongis firme coriaceis crassiusculis penniveniis utroque angustatis apice vero obtusis basi acute cuneatis 8-11 cm. longis 3.5-5 cm. latis basi integra excepta grosse serratis (dentibus 1-2 mm. altis 4-7 mm. latis) glaberrimis lucidulis exsiccatione fuscescentibus; venis lateralibus numerosis parallelis aliis conspicuis aliis obscuris; petiolo 1.4-2 em. longo; corymbo terminali composito trichotomo denso valde convexo multicapitulato fulvo-puberulo; bracteis inferioribus lanceolato-oblongis ca. 2 em. longis 3-4 mm. latis obscure crenato-serratis, bracteolis subulatis minimis; capitulis ca. 5-floris subsessilibus (immaturis) ca. 6 mm. longis et 2.4 mm. crassis; involuci subcylindrici ca. 3-seriatim imbricati squamis crassis eveniis valde inaequalibus anguste oblongis glabris obtusis paullo carinatis apicem versus paullo brunnescensibus; corollis (valde immaturis) ca. 3 cm. longis brevissime 5-dentatis limbum versus granulatis vel hispidulis alter glabris; antheris apice cum appendice membranacea ovato-oblonga instructis; pappi setis ca. 40 albis distinctis.— BRITISH GUIANA: Mt. Roraima, ledge, 18-12-'84, alt. 2135 m., E. Jenman, no. 311 (TYPE, U. S.); ledge, Roraima Exp., E. F. Im Thurn (K., phot. Gr.). These specimens appear absolutely identical, both being tips of branches carrying two or three of the upper leaves and a terminal corymb in bud. In each there has been some damage from insects, especially to the immature achenes. This is certainly the plant mentioned by Daniel Oliver, Trans. Linn. Soc. ser. 2, Bot., ii. 277 (1887), as "No label. EUPATORIUM, sp.? (not identified)." Although the material is poor, it discloses practically

all the features important for classification. It appears to be very different from any species known and may well have published record. It has somewhat the habit of a *Sympyopappus*, but the pappus-bristles are capillary and distinct to the base, showing no tendency to become firm or to be connate into a ring. It may here be mentioned that recent examination of *Sympyopappus* leads to the belief that it is an exceedingly weak genus of very doubtful distinctness and little taxonomic value. Its distinctions from *Eupatorium*, both technical and habitual, break down completely.

E. SCIAPHILUM Robinson, Proc. Am. Acad. liv. 256 (1918). This interesting species, originally collected in Dept. Antioquia, Colombia, by *Kalbreyer*, appears to have been rediscovered by Dr. Pennell in the shrub zone, alt. 2800-3000 m., below Parámo de Chaquiro, Dept. Bolívar, Colombia, no. 4349 (N. Y.). Dr. Pennell's plant while agreeing with the original material in all the more essential points differs in having the leaves crowded, somewhat smaller (about 4 cm. long) and less rigidly coriaceous, the contour being elliptic-oblong rather than spatulate-oblong. In the presence of close agreement in the inflorescence, involucle, florets, achenes, pappus, pubescence, etc., it is probable that these differences are largely the result of individual environment or are at most only of a formal nature.

E. SCIATRAPHES Robinson, Proc. Am. Acad. liv. 257 (1918). Among the plants recently collected in Venezuela by Prof. H. Pittier is a *Eupatorium* in bud. It is labeled as follows: "Niquibao. Fls. pale lilac. Medicinal, pectoral. Around Caracas: altitude 800 to 1000 meters. Cultivated. June, 1918. H. Pittier, no. 7882." In habit, foliage, pubescence, as well as in the details of inflorescence and florets, so far as shown, this plant so closely coincides with the Santo Domingan *E. sciaphthes* that its specific identity seems practically assured. As in the original material the number of florets in the closely fastigiate heads shows considerable variability, ranging in the Venezuelan material from 4 to 8, while in the Santo Domingan specimens examined it ranged from 8 to 13. More mature material of the Venezuelan plant would be essential to prove with absolute certainty the identity, yet the highly characteristic habit, texture, lucidity, and nervation of the leaves, etc., give fairly conclusive evidence. It is to be observed that the Venezuelan material is from cultivated stock, so there is as yet no evidence that the plant is indigenous on the continent.

E. (§ *Eximbricata*) *simulans*, spec. nov., ut dicitur herbaceum vel fruticosum 1-2 m. altum; caule tereti griseo-brunneo juventate

granulari-puberulo tardius subglabrato flexuoso oppositirameo folioso vel basin versus delapsu foliorum nudato et nodoso; foliis oppositis lanceolatis caudato-acuminatis argute serratis basi plerumque abrupte angustatis vel subcuneatis 5-7 cm. longis 1.3-2.5 cm. latis penniveniis (sed 2-3 venis inferioribus utroque latere aliis saepe distincte majoribus) membranaceis utrinque obscure viridibus; petiolis 8-11 mm. longis nullo modo muriculatis; corymbis caulem ramosque terminantibus valde convexis 8-10 cm. diametro laxiusculis; pedicellis filiformibus ca. 1 cm. longis bracteolatis glabris vel obscure granulatopuberulis; capitulis ca. 22-floris ca. 1 cm. longis et crassis; involucri campanulati squamis ca. 20 linearibus attenuatis dorso parce granulatis vix costulatis apicem versus textura flaccidis; corollis purpureis vel roseis glabris paullo sursum gradatim ampliatis 6.5 mm. longis; achaeniis valde immaturis primo aspectu glabris parce granulatis gracilibus obscure griseis cum costis paullo pallidioribus; pappi setis ca. 36 corollam subaequantibus scabridulis.—PERU: Dept. Ancachs: among bushes in the gorge of a brook on the slopes of the Cordillera Blanca, above Caraz, alt. 3200-3600 m., 9 June, 1903, Dr. A. Weberbauer, no. 3253 (TYPE, Berl., phot. and fragm. Gr.); also among small bushes on a brook, above Oceros, Prov. Cajatambo, alt. 3300 m. 2 Apr. 1903, Weberbauer, no. 2766 (Berl., phot. and fragm. Gr.).

A species closely simulating *E. stictophyllum* described below, but having smaller impunctate feather-veined leaves and petioles without muriculate roughening.

E. SOLIDAGINOIDES HBK., var. *Armourii*, var. nov., foliis bracteisque triangulare-hastatis basi profunde cordatis; lobis basilaribus acutiusculis patenti-deflexis; dentibus marginis rotundatis.—MEXICO: Palenque, Chiapas, Feb., 1895, A. V. Armour, no. 1 (Field Mus., phot. Gr.). This plant is exceedingly puzzling. The hastate lobing and deeply crenate instead of serrate-dentate margins of the leaves give it a very different appearance from the usual forms of *E. solidaginoides* HBK. However, the species exhibits considerable variability and specimens have long been known (e. g. Pringle, no. 3956, from limestone ledges, Tamasopo Cañon, San Luis Potosi) in which the leaves are in a similar manner cordate by a deep and narrow sinus and exhibit some tendency to become hastate through the production of an external basal angle at least on one side. It seems probable, therefore, with such approaches already evident, that complete intergradation as to foliage will ultimately be found between the typical form and the present variety, notwithstanding its striking character. In all traits of inflorescence, flowers, achenes, etc., the

correspondence is pretty close and in many details amounts to identity.

E. (§ Subimbricata) Sprucei, spec. nov., suffruticosum 2-3 dm. altum suberectum; radice e fibris paucis gracilibus duris elongatis sistente; caule curvato-adscente, basin versus distincte lignescente 4 mm. crasso noduloso griseo-brunneo a dekapsu foliorum nudato, in parte media folioso, internodiis brevibus, in parte superiore gracili erecto crispe fulvo-puberulo paniculatum florifero paullo foliaceo-bracteato, internodiis elongatis; foliis oppositis sessilibus oblanceolatis utroque attenuatis acutisque subremote denticulatis (dentibus 0.5 mm. altis 5 mm. distantibus) penniveniis (venis utroque 6-7 adscentibus curvatis inter se anastomosantibus) membranaceis supra viridibus glaberrimis obscuris subtus pallidioribus praecipue in nervo venisque sordide pubescentibus 5-10 cm. longis 1-1.8 cm. latis; capitulis 6 mm. longis 5 mm. crassis ca. 18-floris; pedicellis filiformibus valde inaequalibus (1-6 mm. longis); involuci turbinati squamis ca. 20 linear-oblengis valde inaequalibus obtusis stramineis plerisque medio 2-costulatis apicem versus dorso puberulis, extimis brevissimis ovalibus subherbaceis; corollis verisimiliter albis 3 mm. longis glabris, tubo proprio gracillimo 1.8 mm. longo, faucibus turbinatis distincte ampliatis 1.2 mm. altis; styli ramis cum appendicibus tenuibus attenuatis flexuosis papilloso-scabratibus munitis; antheris apice cum appendice membranacea angusta instructis; achaenii (submaturis) fuscis 1.5 mm. longis in angulis parce hispidulis; pappi setis ca. 25 delicatissimis albis 2.5 mm. longis vix scabratibus.—PERU: along the River Huallaga, September, 1855, Spruce, no. 4167 (Gr.).

This low, upright undershrub is obviously a member of the peculiar group of § *Subimbricata* to which the following species may be referred: *E. elata* Steetz of the Panama region, *E. Squiresii* Rusby of the delta regions of the Orinoco in Venezuela and the Magdalena in Colombia, *E. turbacense* Hieron. also from Colombia, and *E. tovarensis* Robinson from western Venezuela. In all these species the leaves are of the oblong-lanceolate type, opposite and feather-veined, the heads are small, in a loose, somewhat divaricately branched panicle; the involucre is stramineous, of delicate graduated scales, which are obtuse and usually a little tufted with a sparse puberulence on the back toward the tip; finally in all the style-branches have appendages which are slender-filiform, more delicate, more flexuous, and more distinctly hispidulous than is usual in *Eupatorium*. In regard to the style-branches these species recall conditions usual in *Vernonia* and in *Brickellia diffusa*. *E. Sprucei*, geographically remote from the others, differs from all of the others in its much lower stature, being only

2-3 dm. high as opposed to plants of a meter or so in height, considerably looser growth, and mostly herbaceous character. In *E. Squiresii* and *E. elatum* the upper surface of the leaves is distinctly though sparingly puberulent. In *E. tovarensis* the leaves are lanceolate not oblanceolate and are strikingly glandular-atomiferous beneath. *E. turbacense* is said to attain 2 m. in height. It has lanceolate to ovate leaves 5-7 cm. wide, and its involucre is more campanulate and has the scales usually 3-4-costulate. The florets are also somewhat more numerous, 25-28.

It is clear that *E. Sprucei* cannot at present be united with any of these, yet they are all exceedingly close and may sometime be found to intergrade.

E. SQUALIDUM DC., var. **Rusbyanum**, var. nov., laxe ramosum; caule ramisque flexuosis griseo-tomentellis; pilis albidis minutis plerisque incurvis non evidenter articulatis; foliis membranaceis ovato-lanceolatis vel ovatis supra cum pilis minutis albis subappressis sparse conspersis, subtus sordide tomentellis et glandulari-punctatis, indumento densiusculo glandulas obscurante; capitulis 18-20-floris; involuci squamis laevissimis saepissime brunnescentibus apice rotundatis vel obtusis arcte appressis ciliolatis; achaenii 2.5 cm. longis.—*E. scabrum* Britton, Bull. Torr. Bot. Club, xviii. 333 (1891), not L. f. *E. Martiusii* Ktze. Rev. Gen. iii. pt. 2, 148 (1893), not DC. — BOLIVIA: at Guanai in Prov. Larecaja, Dept. La Paz, alt. 610 m., May, 1886, Rusby, no. 1623 (TYPE, N. Y., phot. Gr.); in Prov. (East) Velaseo, Dept. Santa Cruz, alt. 200 m., July, 1892, Kuntze (N. Y.). PERU: without locality, Matheus (N. Y.).

This plant differs from *E. scabrum* L. f. considerably in the form and texture of the leaves as well as in the much shorter not obviously jointed pubescence. This variety may be distinguished from both var. *Martiusii* (DC.) Bak. and var. *subvelutinum* (DC.) Bak. by its denser pubescence on the lower surface of the leaves, the hairs being so close as to obscure almost wholly the glandular punctation which is clearly evident, indeed rather conspicuous, in the varieties just mentioned. From var. *tomentosum* (Sch. Bip.) Bak. the present plant differs in its distinctly smaller heads, fewer florets, more cylindrical and less ovoid involucre, etc.

E. SQUIRESII Rusby in Robinson, Proc. Am. Acad. liv. 258, 337 (1918). Soon after the publication of this species two specimens were received at the Gray Herbarium of much interest in connection with it. They were Dr. Pennell's nos. 3928 and 3929, collected in an alluvial thicket, alt. 80-90 m., at Badillo, Rio Magdalena, Dept.

Santander, Colombia, 16 Jan. 1918. These correspond closely in all essential and most minor features with the original material of *E. Squiresii* from the delta of the Orinoco and certainly appear to be conspecific with it. The only differences found during a rather detailed examination were that the leaves of the Colombian plant were slightly firmer in texture and even more shortly petioled or subsessile. These differences are precisely of the kind and degree that occur very frequently between exposed and shade forms of the same plant. The range of the species is thus extended some 1500 km. and over the watershed from the Orinoco Valley into that of the Magdalena. However, there is little difference in the latitude, and the habitat, low alluvial thickets, is similar. Renewed examination of the plants of this group brings out what had not been previously noticed, namely, the affinity between this species and *E. turbacense* Hieron. Of the latter species the writer has not seen the type, Stübel's no. 51, collected at Turbaco, Dept. Bolívar, in the delta region of the Magdalena. However, Hieronymus when publishing upon the plants of Lehmann (Engl. Bot. Jahrb. xxviii. 573) identifies with his *E. turbacense* Lehmann's no. 5971, and of this a leaf and a bit of the inflorescence were received at the Gray Herbarium some years ago in an exchange from the Royal Botanical Garden at Berlin. This plant of Lehmann's was collected on the Rio Ortegá in the Dept. Cauca, that is to say, some 900 km. to the south of the original station. If Hieronymus has been right in referring it to his *E. turbacense*, the following differences may be pointed out between that species and the later *E. Squiresii*. In *E. turbacense* the leaves are entirely glabrous above, while in *E. Squiresii* they are puberulent at least on the midnerve and sometimes perceptibly so on the surface as well; in *E. turbacense* the lowest two pairs of lateral veins leave the midnerve at an angle of about 40° and in length considerably exceed those arising at a greater distance from the base, while in *E. Squiresii* the lower pairs of veins are no longer, indeed are usually shorter than some of the others, and all of them leave the midnerve at a considerable angle, usually at about 70°. In *E. turbacense* the involucre is campanulate, in *E. Squiresii* it is somewhat longer and campanulate-subcylindric (in the fresh state) or campanulate-subturbinate (in the dried state). In *E. turbacense* the pubescence of the pedicels is distinctly longer and more sordid-tawny than in *E. Squiresii*. The two species are certainly very close. In both the lower leaves have a peculiar form, the lance-oblanceolate blade being narrowed at the base into a more or less elongated portion like a broadly winged petiole. It

must be emphasized that the validity of the distinctions made above depends upon the accuracy with which Hieronymus identified Lehmann's no. 5971 from the region of Popayan with Stübel's no. 51, the original material of *E. turbacense* from near the mud-volcano of Turbaco. The writer has had no opportunity to have this identification controlled by a re-examination.

E. (§ Subimbricata) Steetzii, spec. nov., fruticosum ramosum robustum 2-3 m. altum; ramis teretibus dense cum tomento purpureo-brunneo obtectis, capillis articulatis patentibus; foliis oppositis ovato-oblongis acutis vel acuminatis, crenato-serratis basi saepius rotundatis rarius paullo cordatis 7-20 cm. longis 5-12 cm. latis supra cum basibus incrassatis capillorum dense scabratibus et cum glandulis subsessilibus interspersis subtus griseo-tomentosis supra basin 3-nervatis; petiolo 1.2-3.8 cm. longo crasso dense tomentoso; corymbis densis trichotomis pluricapitulatis; capitulus ca. 15-18-floris breviter pedicellatis; involueri campanulati squamis ca. 15 subtriseriatis stramineo-purpureis oblongo-lanceolatis acutiusculis vel subattenuatis dorso glabris; corollis 5 mm. longis gradatim sursum ampliatis glabris albis marginem versus purpurascens (Fendler); achaeniis 2.8 mm. longis brunneis cum glandulis sessilibus scabratibus; pappi setis ca. 40 stramineo-albidis barbellatis 5 mm. longis saepius purpureo-tinctis.—*E. Vargasianum* Robinson, Proc. Am. Acad. liv. 289 (1918), as to character, not DC., also Robinson, I. c. 339 excl. pl. of Vargas.—**VENEZUELA**: in the State of ARAGUA: near Colonia Tovar, Fendler, no. 647 (TYPE, Gr.); without exact locality, Cruger (K.). In the FEDERAL DISTRICT: Caracas, Linden, no. 137 (K.); in forest, Boca de Tigre, Altos de Galipán, Cerros del Avila, alt. 1600 m., Pittier, no. 8302 (Gr.); La Ciénega, alt. 2280 m., Silla de Caracas, Coastal Range, alt. 2000-2640 m., Pittier, no. 8314 (Gr.). Dedicated to the memory of Joachim Steetz (1804-1862), a physician of Hamburg and a discriminating investigator of the *Compositae*, who by some unpublished notes on a drawing of this plant now in the Gray Herbarium appears to have been the first to recognize its probable novelty.

E. (§ Eximbricata) stictophyllum, spec. nov., fruticosum usque ad 1 m. altum; caule tereti purpureo-brunneo oppositirameo juventate obscure puberulo; foliis oppositis ovato-lanceolatis caudato-acuminatis basin versus rotundatis deinde abrupte subacuminatis serratis firmuscule membranaceis glabris supra obscure viridibus subtus pallidius viridibus nigro-puncticulatis delicatule reticulatos venulosis (venulis non prominulentaibus) 6-8 cm. longis 3-4 cm. latis a puncto ca. 5 mm. supra basin 3-nervatis, nervis lateralibus brevi

spatio furcatis vel aliquando pro nervo uno latere nervis duabus proximis substitutis; petiolo puberulo parce muriculato; corymbis terminalibus compositis planiusculis foliaceo-bracteatis, particularibus densiusculis fastigiati ramosis convexis; capitulis ca. 24-floris 1 cm. longis; pedicello filiformi 6-10 mm. longo bracteolato; involuci campanulati squamis ca. 24 anguste lanceolato-linearibus inaequalibus sed vix imbricatis acutis purpureo-viridibus extus granulari-pulverulentis; corollis 7.8 mm. longis roseis glabris vix sursum ampliatis; achaeniis (immaturis) 3 mm. longis cum glandulis subsessilibus instructis; pappi setis ca. 27 albis scabridis corollam subaequantibus. — PERU: in bushy places about Cuyocuyo, Prov. Sandia, Dept. Puno, alt. 3100 m., Dr. A. Weberbauer, no. 860 (Berl., phot. and fragm. Gr.).

E. (§ Subimbricata) tarapotense, spec. nov., verisimiliter fruticosum oppositirameum; caulis subteretibus purpureis crispe fulvo-puberulis (pilis articulatis), internodiis 4-6 cm. longis; foliis oppositis ovato-ellipticis petiolatis acuminatis basi rotundatis remote serratis (dentibus ea. 1 mm. altis ca. 1 cm. inter se distantibus) penniveniis (venis principibus ea. 5-jugis) coriaceis supra atroviridibus nitidis in nervo venisque depresso puberulis subtus pallidioribus tomentellis et atomiferis 4-8 cm. longis 1.5-4 cm. latis; petiolo ca. 1 cm. longo fulvo-puberulo; cymis paucicapitulatis ramos ramulosque terminantibus conjunctim paniculam laxiusculam foliaceo-bracteatum formantibus; pedicellis 1-3 mm. longis; capitulis ca. 37-floris ea. 1 cm. altis; involuci campanulati squamis ca. 18 gradatis acutiusculis, extimis late ovatis 5-7-costulatis fusco-brunneis dorso pubescentibus, intermedii ovatis 3-5-costulatis substramineis, intimis linearis-oblongis acutis stramineis ciliolatis dorso plus minusve puberulis; corollis glabris ca. 6 mm. longis, tubo proprio gracili ca. 4 mm. longo, faucibus paullo sed distincte ampliatis 1.5 mm. altis, dentibus 5 detoideis 0.5 mm. longis extus granulatis; achaeniis graciliter prismaticis fusco-brunneis 2.3 mm. longis; pappi setis inaequalibus corolla distincte brevioribus. — PERU: in the mountains along the river Mayo, near Tarapoto, Dept. Loreto, July-Aug., 1850, Spruce, no. 4014 (Gr.). In habit similar to *E. Lobbii* Klatt, but readily distinguished by its much thicker, pinnately veined leaves, which are shining above.

E. (§ Eximbricata) uber, spec. nov., fruticosum 4 m. altum; ramis oppositis robustis griseo-brunneis foliosis granuloso-puberulis medullo-sis; foliis oppositis magnis petiolatis deltoideo-ovatis acuminatis integris vel obsolete undulato-denticulatis basi abrupte subcuneatis supra glabris viridibus (venulis reticulatis depresso) subtus sordide puberulo-

tomentellis 16–19 cm. longis 6–9 cm. latis; nervis lateralibus principibus (2-jugis) ca. 1 cm. supra basin laminae nervo medio orientibus; petiolo 3–5 cm. longo granulari-puberulo; panicula terminali corymbiformi planiuscula usque ad 2 dm. diametro breviter crispeque pubescenti; capitulis numerosissimis breviter pedicellatis ca. 13-floris ea. 9 mm. longis; involucri angusti campanulati squamis ca. 16 lineari-oblongis acutuseculis (obscure 2-costatis) subaequalibus (1–3 extimis brevioribus) dorso granularibus margine eroso-ciliolatis; corollis ea. 5 mm. longis albis sursum gradatim mediocriter ampliatis; limbi dentibus 5 deltoideis; achaenii griseo-brunneis deorsum decrescentibus 2.5 mm. longis in angulis hispidulis basi conspicue callosis; pappi setis ca. 31 barbellatis corollam fere aequantibus sordide albidis.—PERU: woods near a brook, below Pampa Romas, between Samanco and Caraz, Dept. Ancachs, alt. 2100 m., 29 May, 1903, *Weberbauer*, no. 3184 (Berl., phot. and fragm. Gr.). A species of exceptional luxuriance both as to flowers and foliage, somewhat resembling the Bolivian *E. longipetiolatum* Sch. Bip. ex Rusby, Mem. Torr. Bot. Club, iii. no. 3, 52 (1893), which, however, has a more open inflorescence, shorter, relatively broader, and dorsally more pubescent involucral scales, purple corollas, more or less clearly crenate leaves, etc. *E. uber* is also close to the Bolivian *E. gloeocladum* Robinson described above, which, however, has smaller lance-ovate, regularly feather-veined leaves, viscid stems, etc.

E. (§ *Subimbricata*) *urubambense*, spec. nov., herbaceum et perenne vel fortasse fruticosum (basi ignota); caulis (vel ramis) erectis teretibus purpureis crispe albo-puberulis; foliis oppositis ovato-lanceolatis fere a basi ad apicem gradatim angustatis sed apice vero saepissime obtusiusculis basi obtusis vel rotundatis crenatis a punto supra basin 3-nervatis crassiusculo-membranaceis supra obscure viridibus puberulis leviter rugulosis subtus griseo-tomentosis 5–6.6 cm. longis 1.8–2.7 cm. latis; petiolo 5–8 mm. longo; corymbis trichotomis foliaceo-bracteatis; inflorescentiis particularibus densis rotundatis 3–6 cm. diametro; capitulis ca. 10-floris ca. 8 mm. altis subsessilibus; involucri subcylindrico-campanulati squamis ca. 3-seriatim apice rotundatis, exterioribus brevissimis, intermediis late ellipticis brunneo-stramineis saepissime 3-nervatis et 4-costulatis aliquanto marginatis, intimis lineari-oblongis apice paullo eroso-ciliatis; corollis 4.8 mm. longis graciliter tubulosis supra basin sensim constrictis glabris; achaenii fuscis 2.6 mm. longis deorsum attenuatis sursum in costis villosis; pappi setis ca. 28 lucidulis flavido-albidis 4.3 mm. longis sublaevibus.—PERU: Urubamba in the Valley of Ymay [?], *Pentland* (K., phot. and fragm. Gr.).

E. VALLINCOLA DC. Prod. v. 168 (1836). Of this species two varieties

with markedly different pubescence but otherwise of close similarity can be distinguished, namely:

Var. *a. typicum*, caulibus et ramis et petiolis dense patenterque villosis; pilis longis tenuibus flexuosis articulatis.—PERU: without locality, *Haenke* (DC., phot. Gr.); on calcareous rock, near Lima, alt. 300–600 m., *Weberbauer*, no. 1650 (Berl., fragm. Gr.).

Var. *β. brevipilum*, var. nov., puberulum vel tomentellum; pilis plerisque brevibus inarticulatis paucis passim longioribus.—PERU: on the Lima-Oroya Railroad, between Matucana and Tambo de Viso, on rocks, alt. 2370–2650 m., 26 Dec. 1901, *Weberbauer*, no. 103 (TYPE, Berl., fragm. Gr.); on slopes of eruptive rock, Matucana, alt. 2370 m., 24 Dec. 1901, *Weberbauer*, no. 66 (Berl.).

E. Vargasianum DC. Prod. v. 155 (1836). Further study of this species leads to the belief that it has been misinterpreted and that to it should be referred *E. macrophyloides* Robinson, Proc. Am. Acad. liv. 249, 340 (1918). The only two collections of the species known to the writer are as follows: at Caracas, *Vargas* (DC., phot. Gr.), and at Sanchorquiz, *Eggers*, no. 13,413 (U. S.). The localities, both in the Federal District of Venezuela, are not far apart.

The species has been reported twice from Colombia, namely by Klatt in Engl. Bot. Jahrb. viii. 36 (1887), on the basis of Lehmann's no. 938 from near Popayan, and by Heering, Mém. Soc. Neuchâtel Sci. Nat. v. 420 (1913), on Mayor's no. 392, from near Medellin. The writer has seen neither of these specimens and cannot confirm the accuracy of their determination, indeed is inclined to question it.

A related plant, confused with *E. Vargasianum* by Klatt in herb. and by the writer, ll. cc., appears to be a new species and is described above as *E. Steetzii*. The confusion of these two plants and the accidental omission of one species from the author's key to § *Subimbricata* of the Venezuelan Eupatoriums, Proc. Am. Acad. liv. 337 (1918), necessitates a revision of the last few lines of the key, thus:

- i. Shrubs; leaves (5–) 6–13 cm. wide j.*
- j. Heads in thyrsoid panicles; scales rounded or obtuse; stem glabrate..... 19. E. morifolium.*
- j. Heads in corymbosely branched flattish-topped panicles; scales acute; stem tomentose k.*
- k. Leaves about two-thirds as wide as long; petioles 1.2–3.8 cm. long; heads 15–18-flowered; achenes covered with sessile globules..... 20. E. Steetzii*
- k. Leaves about four-fifths as wide as long; petioles 4–6 cm. long; heads 10–11-flowered; achenes hispid-puberulent..... 21. E. Vargasianum.*

- i. Perennial herbs; leaves 2-4.5 (-5) cm. wide; heads crowded *l.*
 - l. Heads about 7-flowered, sessile in dense subglobose glomerules; involucre subcylindric 22. *E. tenuifolium.*
 - l. Heads 20-25-flowered; pedicels 1-9 mm. long; involucre turbinate-campanulate 23. *E. pycnocephalum.*
- i. Delicate annual; leaves thin, 2-5.5 cm. wide; inflorescence diffuse 23. *E. microstemon.*

Brickellia ? Arsenei, spec. nov., herbacea perenne virgata 7 dm. vel ultra alta; caule tereti gracili usque ad 3 mm. crasso folioso paullo flexuoso atropurpureo crispe griseo-puberulo; internodiis 1.5-4 cm. longis; foliis suboppositis vel saepe ternatim verticillatis sessilibus lanceolatis argute acuminatis basi rotundatis serrulatis chartaceis 3-4.5 cm. longis 1-1.6 cm. latis pennivenis supra reticulatis et minute granulatis subtus paullo pallidioribus reticulatis et in costa media et in venis majoribus puberulis; inflorescentia terminali multicapitata corymbosa convessa; capitulis graciliter pedicellatis ca. 12-floris ca. 1 cm. longis; involucri squamis ca. 20, 3-4-seriatim imbricatis regulariter gradatis, extimus brevissimis puberulis ceteris lanceolato-oblongis obtusiusculis glabris 3-nerviis in parte exposita atro-vinaceis; flosculis valde immaturis; corollae dentibus anguste oblongis; antheris angustis ad apicem longiuscule appendiculatis; pappi setis albidis vix scabridis.— MEXICO: vicinity of Morelia, State of Michoacan, 26 Oct., 1911, alt. 2500 m., Bro. G. Arsène, no. 5608 (Gr., U. S.), distributed as *Eupatorium pulchellum* HBK. It is unfortunate that this beautifully distinct plant, obviously of the *Eupatorium* tribe, is available only in bud, so that it is impossible to determine the form of the mature achenes. However, as it is unlikely that the locality will be visited by a botanist for some time to come, and as the habit and such details of floral structure as are shown pretty clearly indicate that this is a new species of *Brickellia* § *Steviastrum*, the writer ventures to give it provisional record on this theory. It is a pleasure to dedicate it to Bro. Arsène, whose careful collections are among the most extended and valuable which have come from Mexico in recent years.

CALEA CARACASANA (HBK.) Ktze., var. PILOSIOR Ktze. Rev. Gen. i. 324 (1891). Of this more hairy variety of this common and in northern South America somewhat widely distributed and variable species, there is, besides the more common radiate state, a discoid form which may be recorded as follows:

Forma **discoidea**, forma nova, pubescens ut apud var. *pilosorem*, capitulis homogamis, radiis nullis.— COLOMBIA: forest, alt. 1200-1500 m., "La Virginia," Libano, Dept. Tolima, 22 Dec., 1917, *Pennell*, no. 3264 (N. Y.). Florets greenish-yellow.

SCHIZOTRICHIA EUPATORIOIDES Benth. in Benth. & Hook. f. Gen. ii. 410 (1873). A specimen of this rare and highly interesting generic monotype has been found among some *Eupatoriums* kindly lent to the writer from the New York Botanical Garden. Although unidentified, this specimen, collected in Peru by Mathews and corresponding in all described details with Bentham's clear diagnosis, is with scarcely a doubt a part of the original material secured by Mathews at Chachapoyas about 1836. Bentham in his treatment (l. c.) places the genus among the *Helenieae*, but adds at the end the remark that the plant might perhaps rather belong to *Eupatorium*. However, its short, blunt, and strongly recurved style-branches, its involucral scales marked with the immersed elongated glands characteristic of certain *Helenieae*, the subterete achenes, and the peculiar pappus of fimbriate scales all are foreign to or very unusual in the *Eupatorium* tribe, with which it certainly can have nothing to do.

Although Bentham gives a somewhat detailed generic character and mentions a specific name, he gives no specific diagnosis. To place the plant upon a somewhat more regular footing in this regard the following brief character may be put on record:

S. **EUPATORIOIDES** Benth., l. c., lignescens paullo pubescens; ramis dichotomis subteretibus foliosis; foliis elliptico-ovatis crenulatis tenuibus apice rotundatis et mucronatis basi rotundatis penniveniis 2-2.5 cm. longis 1-1.5 cm. latis breviter petiolatis; cymis sessilibus laxis compositis; bracteis minutis squamiformibus, pedicellis filiformibus glabris usque ad 1.5 cm. longis; capitulis ca. 8 mm. altis et crassis; involueri squamis principibus ca. 8 elliptico-oblongis tenuibus glabris subaequalibus dorso cum glandulis flavidis elongatis munitis; flosculis ut a Benthamio descriptis.—PERU: Chachapoyas, Mathews. In habit somewhat suggesting *Porophyllum*.

II. A RECENSION OF THE EUPATORIUMS OF PERU.

The literature of the Peruvian Eupatoriums is not extensive, the more important records on the subject being as follows: In 1786, Lamarck (Encycl. ii.) described as from Peru four species of *Eupatorium*, but of these one has since proved a *Steria* and the others, collected by Joseph de Jussieu, came presumably from what is now Ecuador. Kunth in 1820, having worked over the collection of Humboldt & Bonpland, published (HBK. Nov. Gen. et Spec. iv.) descriptions of six species of *Eupatorium* from Peru, all being new to science. In 1836 the eldest DeCandolle (Prod. v.) indicated the Peruvian occurrence of twenty-one species of the genus, but several of these have subsequently dropped into synonymy or passed to other genera such as *Ophryosporus* and *Helogyne*. Poeppig in 1845 (Nov. Gen. ac Spec. iii.) added to the group five Peruvian species. Of these, however, at least two have since fallen into synonymy. In 1857, Weddell (Chlor. And. ii.) ascribed six species of *Eupatorium* to Peru, of which four were described as new, two of them being his own and the other two being species proposed but never characterized by Schultz-Bipontinus. In 1876, Baker (in treating the genus *Eupatorium* for von Martius's Flora Brasiliensis vi. pt. 2) incidentally mentions eleven species as extending into Peru. In 1883, Oliver (in Hook. Ic. xv. t. 1462) added an interesting species secured by John Ball. Klatt (Abh. Nat. Gesellsch. Halle, xv. and Ann. Nat. Hofmus., Vienna, ix.) described two new Eupatoriums from Peruvian material. Finally Hieronymus (in Engl. Bot. Jahrb. xxix., xxxvi., xl., and Verh. Bot. Ver. Brandenburg, xlvi.)., after working over collections chiefly of von Jelski and of Weverbauer, mentions or discusses some twenty-eight species and varieties of Peruvian Eupatoriums, nineteen of these being characterized as new.

At no time has any effort been made to catalogue the Peruvian members of this group as such or to synopsize or key them. The present paper is put forth to assemble data previously scattered and to place on published record several species found in material recently worked. It is hoped that the treatment, while representing merely a stage in the course of work still in progress, will furnish what has certainly never before existed, namely, a means of speedy and accurate identification of the Peruvian Eupatoriums, besides adding some new elements to the group.

To save space, references are made where possible to the sectional,

specific, and varietal descriptions in the author's recent paper on the Eupatoriums of Colombia, Venezuela, and Ecuador. In the case of Peruvian species and varieties not occurring in any of these countries and therefore not described in the paper just mentioned, diagnoses are here given. Thus, by the use of the two papers together, anyone desiring to identify a Peruvian *Eupatorium* will be able to consult a fairly detailed diagnosis of each species and variety of the genus thus far known from the country.

Sect. I. CYLINDROCEPHALA DC. (See Robinson, Proc. Am. Acad. liv. 270.)

KEY TO SPECIES.

- a. Involucral scales squarrose, considerably altered in texture and somewhat spreading at the subtruncate or very bluntly pointed tip; leaves linear or narrowly oblong, nearly or quite sessile. 1. *E. ivaefolium*.
- a. Involucral scales closely appressed at the often darkened but not greatly modified tip; leaves lanceolate to deltoid- or rhombic-ovate, petiolate *b*.
 - b. Heads solitary, long-pedicelled; leaves scabrous above, glabrous beneath; habit of § *Praxelis* 2. *E. serratuloides*.
 - b. Heads corymbose or cymose-paniculate; leaves never pubescent above if glabrous beneath *c*.
 - c. Heads 40-50-flowered; leaves small, lanceolate, 2.5-3.5 cm. long 3. *E. eripsimum*.
 - c. Heads 7-35-flowered; leaves (except in *E. squalidum*) rarely less than 4 cm. long *d*.
 - d. Pedicels glabrous or at most minutely granulated, furrowed; leaves glabrous on both surfaces, elliptical to rhombic, acute at both ends, thickish 4. *E. laevigatum*.
 - d. Pedicels (when developed) pubescent *e*.
 - e. Heads very slender, 7-10-flowered, acute in bud *f*.
 - f. Involure essentially glabrous; leaves attenuate-cuneate at base, mostly thin and nigrescent in drying 5. *E. leptcephalum*.
 - f. Involucral scales (at least when young) definitely pubescent, especially toward the dark and mucronulate tip; leaves subrotund or only shortly cuneate at base, thickish-membranaceous, drying green 6. *E. tenuicapitulatum*.
 - e. Heads thicker, mostly 15-35-flowered, obtuse in bud *g*.
 - g. Heads about 8 mm. long, borne in a leafy panicle; leaves 1.5-4 cm. long; petioles 1-4 mm. long 7. *E. squalidum*, v. *Rusbyanum*.
 - g. Heads 1-1.2 cm. long; leaves 6-10 cm. long on petioles (except in *E. scabrum*) 1-2 cm. long *h*.

- h. Heads in dense terminal and lateral corymbs *i.*
- i. Stems when young furrowed and angulate, covered with long, spreading conspicuously dark-jointed hairs; leaves olive-green beneath, prominently and loosely reticulate-veiny on lower surface, in age strongly bullate-rugose above.....8. *E. scabrum.*
- i. Stems rather finely ribbed, nearly terete, softly and often sparsely pubescent, the hairs short, light-colored, not conspicuously jointed; leaves not prominently netted beneath nor bullate above.....9. *E. odoratum.*
- h. Heads in (at maturity) open panicles *j.*
- j. Leaves deltoid-lanceolate, truncate at the base.....10. *E. clematitis.*
- j. Leaves elliptic-lanceolate, cuneate at the base.....11. *E. Jelskii.*

1. *E. IVAEFOLIUM* L. Syst. ed. 10, 1205 (1759) [as *iuacfolium*]; Robinson, Proc. Am. Acad. liv. 275 (1918). *E. fasciculare* Poepp. in Poepp. & Endl. Nov. Gen. ac Spec. iii. 54 (1845).—HUANUCO: Cassapi, Jan. 1830, Poeppig, no. 1660 (Vienna Hofmus., phot. Gr.). WITHOUT LOCALITY: Mathews, in 1862 (N. Y.). The plant of Poeppig is rather slender and short-leaved in the manner of var. *EXTROSUM* (Sch. Bip.) Bak. in Mart. Fl. Bras. vi. pt. 2, 290 (1876), as *extrosa*, which, however, appears to be merely a reduced state, the result perhaps of local drought. [Braz. to southern U. S.]

2. *E. SERRATULOIDES* HBK. Upright opposite-branched smoothish herb 4–6 dm. high; stem round, striate but nearly smooth; internodes rather long, much exceeding the leaves; these opposite, ovate, short-petioled, crenately 4–6-toothed on each side, 3-nerved, narrowed to an obtuse or rounded apex (not actually acute as stated in original diagnosis), roughish above, ciliate on the margin, glabrous beneath, 1.5–3 cm. long, half as wide, entire at the cuneate base, membranaceous; petiole 3.5–4.5 mm. long; heads subsolitary on the short upper branches, pedicellate, 8 mm. long; involucre campanulate-cylindric, the scales numerous, closely appressed in several series, rounded at the dark-purple tip, ciliate but otherwise glabrous and shining, excessively caducous; florets 7–8 mm. long, scarcely exceeding the involucre; corolla slenderly tubular, scarcely ampliated above, violet and smooth; pappus whitish, barbellate, nearly as long as the corolla.—Nov. Gen. et. Spec. iv. 117 (1820); DC. Prod. v. 143 (1836). *Osmia serratuloides* (HBK.) Sch. Bip. Pollichia, xxii.–xxiv. 252 (1866).—PIURA: steep slopes in cool region, Huancabamba, Humboldt & Bonpland, no. 3525 (Par., phot. Gr.).

3. *E. ERIPSIMUM* Robinson (p. 14). Decumbent undershrub; stems

(3–5 dm. high) and branches curved-ascending to erect, terete, incurved-puberulent, the hairs minute, white, non-glandular; leaves opposite, lanceolate, about equaling the internodes, 2.5–3.5 cm. long, 5–10 mm. wide, subentire or remotely and obscurely 1–3-toothed on each side, 3-nerved from the cuneate short-petioled or subsessile base, attenuate to a narrow but ultimately rounded tip, glabrous but often minutely pustulate above, finely appressed-pubescent on the nerves beneath; heads erect, terminal on the branches of 3–several-headed at length rather loose corymbs; pedicels 5–45 mm. long; involucre cylindric, the scales several-ranked and apparently graduated, the outer ovate to oblong, so excessively caducous as to have entirely fallen away in the material at hand; the inner linear-oblong to linear, all pale, stramineous, 1–4-costulate, especially toward the narrowed but rounded tip, ciliolate, otherwise glabrous; florets about 44; receptacle flattish; corolla slenderly tubular, lilac when fresh but drying dark-purple toward the scarcely dilated throat, 8.5 mm. long, glabrous; teeth 5, narrow, recurved; stamens with an oblong appendage; style-branches lilac, drying dark-purple, 6 mm. long; clavate, widely spreading; achenes prismatic, slightly tapering toward the often curved base, slender, 4.5 mm. long, finely appressed-pubescent, the faces grayish-brown, the ribs stramineous; pappus-bristles about 45, white, barbellate, nearly equaling the corolla.—ANCACHS: in an open formation consisting both of shrubs and herbs, especially bromeliads and cacti, alt. 2200–2500 m., at the town of Caraz, 19 May, 1903, Weberbauer, no. 3003 (Berl., phot. and fragm. Gr.).

In habit somewhat suggesting § *Praxelis*, but referred better to § *Cylindrocephala* on account of its flattish receptacle and the nature of its involucre. Most nearly related to the preceding, but certainly distinct.

4. *E. LAEVIGATUM* Lam. Encyc. ii. 408 (1786); Bak. in Mart. Fl. Bras. vi. pt. 2, 286 (1876); Hieron. in Engl. Bot. Jahrb. xxxvi. 465 (1905); Robinson, Proc. Am. Acad. liv. 273, 333, 346 (1918). *E. resinosum* Poepp. in Poepp. & Endl. Nov. Gen. ac Spec. iii. 54 (1845).—CAJAMARCA: between Chota and Cutervo, von Jelski, no. 793, acc. to Hieron. I. c. LORETO: Moyobamba, Mathews (Gr.). CUZCO: Santa Ana, Cook & Gilbert, no. 1493 (U. S.); Machu Picchu, alt. 2100 m., Cook & Gilbert, no. 1025 (U. S.). HUANUCO: on open savannahs, subandean region, at Cassapi, Poeppig no. 1217 (Hofmus. Vienna, phot. Gr.); without locality, Mathews, nos. 1361, 1362, and 1363 in part (all N. Y.). [Mex. to Argent.]

5. *E. LEPTOCEPHALUM* DC. Prod. v. 148 (1836); Robinson, Proc.

Am. Acad. liv. 278, 346 (1918). PERU: on the Andes, but without record of exact locality, *Haenke* acc. to DC. l. c. [Ecuador, Colombia.] No Peruvian material or more precise record of this species has been seen by the writer, though it appears to be tolerably frequent in Ecuador.

6. *E. TENUICAPITULATUM* Hieron. Opposite-branched, erect, 5 dm. high, herbaceous; stems and branches terete, dull purple, covered at first with a scanty delicate appressed and jointed pubescence; leaves opposite, ovate-lanceolate, caudate-acuminate, finely serrate, firmly membranaceous, appressed-puberulent on the nerves and chief veins, green and glabrous above, lighter green and punctate beneath, about 1 dm. long and 3 cm. wide, base entire, rounded but at the insertion subcuneate; petiole 5-12 mm. long; corymbs terminal, compound, crowded, flattish; heads about 10-flowered, subsessile by 2's and 3's, about 8 mm. long and 2 mm. thick (acc. to Hieron.); involucral scales about 20, stramineous, with dark purplish mucronate pubescent at length slightly squarrose tips.—Hieron. in Engl. Bot. Jahrb. xxxvi. 465 (1905).—CAJAMARCA: near Tambillo, *von Jelski*, no. 598 (Berl., fragm. Gr.).

7. *E. SQUALIDUM* DC. Prod. v. 142 (1836); Bak. in Mart. Fl. Bras. vi. pt. 2, 281, t. 77 (1876); Robinson, Proc. Am. Acad. liv. 334 (1918).

[Var. *TYPICUM* Robinson, l. c. Branches villous-hirsute, the hairs mostly straight, widely spreading, attenuate, with dark articulations; leaves roundish-ovate, of firm texture, very shortly petioled.—Eastern Brazil, e. g. at Marianna, Minas Geraës, *Vauthier*, no. 279 (DC., Gr.), etc.].

Var. *RUSBYANUM* Robinson (p. 34). Stem and branches covered with short whitish mostly incurved and unjointed hairs; leaves ovate-lanceolate to rhombic-ovate, above sparingly appressed-puberulent, beneath sordid-tomentellous and glandular-punctate, the indumentum sufficiently dense to obscure the punctuation.—PERU WITHOUT PRECISE LOCALITY: *Mathews* (N. Y.). [Boliv.]

8. *E. SCABRUM* L. f. Suppl. 354 (1781); J. E. Sm. Ic. iii. t. 67 (1791); Bak. in Mart. Fl. Bras. vi. pt. 2, 299 (1876); Robinson, Proc. Am. Acad. liv. 277 (1918).—PERU WITHOUT LOCALITY: Baker, l. c., extends the distribution of this Colombian species to Peru but does not mention the collector [Mathews?]. The species has been so variously interpreted in the past that this single and undetailed record of its occurrence in Peru must until verification be subject to considerable doubt. [Colombia.]

9. *E. ODORATUM* L. Syst. ed. 10, 1205 (1759); Robinson, Proc. Am. Acad. liv. 280, 346 (1918). *E. conyzoides* Mill. Dict. ed. 8, no. 14 (1768);

Vahl, Symb. iii. 96 (1794); Bak. in Mart. Fl. Bras. vi. pt. 2, 277 (1876). *E. floribundum* HBK. Nov. Gen. et Spec. iv. 118, t. 344 (1820). *E. conyzoides*, var. *floribundum* (HBK.) Hieron. in Engl. Bot. Jahrb. xxxvi. 463 (1905), as *floribunda*. *E. conyzoides*, var. *tambillense* Hieron. l. c. 464.—CAJAMARCA: near Tambillo, *von Jelski*, nos. 783 (Berl., fragm. Gr.), 785 (Berl., fragm. Gr.), and acc. to Hieron. l. c. (under his varieties founded on the highly inconstant number of florets and degree of pubescence) also *von Jelski*, nos. 780–782, 784, 786. [Widely distributed in the warmer parts of America; common and variable.]

10. *E. CLEMATITIS* DC. Shrub with round flexuous smoothish green or brownish stems and opposite divaricate curved-ascending branches; leaves opposite, slender-petioled, rather thin, ovate- or deltoid-lanceolate, acuminate, subentire or shallowly and bluntly 2–3-toothed on each side, subtruncate, rounded or obtusely pointed at the base, 3-nerved, green on both sides, sparingly hirtellous chiefly on the nerves and glandular-punctate or resinous-atomiferous (the resin globules at first golden brown, at length turning whitish), 3–5 cm. long, 1.3–3 cm. wide; petiole about 1 cm. long; corymbs open, mostly few-headed; heads cylindric, 1 cm. long, about 25-flowered; pedicels mostly 6–15 mm. in length; involucral scales smooth, closely appressed, rounded or obtuse at the greenish tips; achenes slender, fuscous, smooth, 4 mm. long.—Prod. v. 144 (1836).—PERU? without exact locality, Poeppig, no. 3108 (DC., phot. and fragm. Gr.).

This species has been studied from a clear photograph of the type in the Prodromus Herbarium at Geneva and a fragment of the type number in the Klatt collection purchased by the Gray Herbarium.

11. *E. JELSKII* Hieron. Hirsute-villous undershrub 1 m. high; branches somewhat virgate, terete, purplish, leafy up into the terminal opposite-branched panicle; hairs articulated, rusty, spreading or somewhat tangled; leaves thin, lanceolate, coarsely few(2–8)-toothed, acute, cuneate at base, 6–9 cm. long, 1.4–3 cm. wide, above sparingly sordid-villous or at length only scabrid, below densely villous-hirsute chiefly on the nerves and larger veins, 3-nerved from near the base; petiole mostly 5–7 mm. long, densely tawny-villous; heads slender, cylindrical, about 20-flowered, about 1 cm. in length, on filiform pedicels at maturity nearly as long; involucral scales about 30, reddish-purple, green-nerved toward the rounded or obtuse slightly puberulent and ciliolate tip; corollas apparently purple, slightly enlarged toward the summit, granulate on the outside; achenes dark-colored.—Hieron. in Engl. Bot. Jahrb. xxxvi. 464 (1905).—CAJAMARCA: near Tambillo, *von Jelski*, no. 665 (Berl., fragm. Gr.). WITHOUT LOCALITY: *Matheus* (N. Y.).

Sect. II. SUBIMBRICATA (DC.) Hoffm. (See Proc. Am. Acad. liv. 281.)

KEY TO SPECIES.

a. Leaves pinnate-veined, the lower veins not conspicuously longer or larger.

b. Leaves on wingless petioles; blade cordate or hastate at the broad base.

Petioles very short, rarely over 1.5 mm. long 54. *E. Weberbaueri.*
 Petioles 1 cm. or more in length.

Leaves cordate, with an open triangular sinus 24. *E. glomeratum.*
 Leaves with a deep narrow sinus at the base.

Leaves cordate, acutish, almost regularly crenate-dentate 25. *E. Gascae.*
 Leaves hastate, caudate-attenuate, with coarse and very unequal rounded teeth 26. *E. anisodontum.*

b. Leaves on wingless petioles; blade rounded at the base (in *E. persicifolium* sometimes shortly acuminate at the point of insertion from a generally rounded base).

Leaves ovate or elliptical, 1.5-2 times as long as wide, acute or barely acuminate.

Leaves membranaceous, dull and puberulent to tomentellous above, the veins not depressed 27. *E. endytum.*
 Leaves coriaceous, shining and glabrous above, the veins reticulated and depressed 28. *E. tarapotense.*

Leaves ovate- or lance-oblong, 2.5-4 times as long as wide, gradually acuminate or attenuate.

Heads about 25-flowered; involucre campanulate-subcylindric, scales 30-40, at length of firm texture, in 4-6 rows; achenes 5.5 mm. long; leaves permanently canescent-tomentellous beneath 12. *E. persicifolium.*

Heads 16-19-flowered; involucre campanulate, scales 16-20, thin, in 3-4 rows; achenes 4-4.5 mm. long; leaves at length green, subglabrate and prominently reticulated beneath 15. *E. Salvia.*

b. Leaves lanceolate to ovate or broadly elliptical, cuneate or at least obtusely pointed at base; petioles wingless, rarely less than 1 cm. long *c.*

c. Leaves puberulent to villous beneath *d.*

d. Leaves lanceolate, caudate-attenuate, remotely few-toothed; pubescence conspicuously ferruginous 29. *E. Mathewii.*

d. Leaves lance-oblong, denticulate, crenulate, or subentire; pubescence white or merely dull, not ferruginous.

Heads 13-15-flowered.

Leaves denticulate, canescent-tomentellous beneath, often 15-18 cm. long 13. *E. buddleafolium.*
 Leaves serrulate, green and finely puberulent on the veins beneath, rarely over 1 dm. long 17. *E. pseudarboreum.*

Heads about 25-flowered; leaves somewhat canescent-tomentellous beneath.

Leaves subentire, scarcely crenulate, cuneate at the base 14. *E. discolor.*

Leaves crenate-denticulate, the base rounded but sometimes shortly acuminate at the point of insertion 12. *E. persicifolium.*

- d. Leaves ovate or elliptical.
 - Heads about 16-flowered; involucral scales obtuse; leaves rhombic-ovate, 3-4.5 cm. wide. 31. *E. helianthifolium*.
 - Heads 20-24-flowered; involucral scales acute; leaves elliptical, at maturity about 1 dm. wide. 32. *E. vestitum*.
- c. Leaves glabrous or merely atomiferous beneath.
 - Heads in a divaricately branched pyramidal panicle; leaves undulate-margined and with a delicate prominent reticulation above. 33. *E. orgyaloides*.
 - Heads in broad terminal rounded corymbs; veinlets not prominent on the upper surface of the serrate leaves.
 - Involucral scales conspicuously arachnoid-ciliate; leaves dull above, 1.5-2.3 cm. wide. 34. *E. drepanoides*.
 - Involucral scales minutely and obscurely ciliolate; leaves lucid above, 3-6 cm. wide. 35. *E. coelocaula*.
- b. Leaves narrowly lance-oblong to linear, sessile or on very short petioles (1-4 mm. long)
 - e. Heads large, 1.4-2.5 cm. long.
 - Involucral scales regularly graduated in 3-4 series; heads 1.4-1.8 cm. long.
 - Leaves linear, about 3 mm. wide. 18. *E. Gayanum*.
 - Leaves lance-oblong, 8-15 mm. wide. 19. *E. Ballii*.
 - Involucral scales much imbricated, but the outer scarcely shorter; heads 2.5 cm. long. 20. *E. Cursonii*.
 - f. Heads 7-10-(12) mm. high
 - Heads mostly 30-40-flowered, in loosely fastigiate branched panicle. 36. *E. amygdalinum*.
 - Heads 7-15-flowered, mostly in dense thyrsoid inflorescence
 - g. Leaves linear or nearly so, 3-6 mm. wide.
 - Leaves strongly deflexed, tardily glabrate and smoothish (not conspicuously rugose-bullate) above, entire (the margins strongly revolute)
 - 21. *E. lavandulaefolium*.
 - Leaves spreading, promptly glabrate and strongly rugose-bullate above, appearing crenulate from the depressed veins in the very revolute margins. 22. *E. chotense*
 - g. Leaves narrowly lance-oblong, 1-2 cm. wide in the middle.
 - Shrubs 1-2 m. high; leaves thickish, of firm texture, chartaceous or coriaceous. 23. *E. Volkensii*.
 - Herbaceous or nearly so, 2-3 dm. high; leaves thin, membranaceous, of soft texture. 37. *E. Sprucei*.
 - b. Leaf-blade contracted below into a winged petiolar portion, either cuneate or cordate-auriculate at its insertion on the stem.
 - Heads 14-17-flowered; leaves entire, tomentulose beneath.
 - 38. *E. pilluanense*.
 - Heads about 20-flowered; leaves coarsely toothed or lobed, coarsely pubescent on the veins beneath. 39. *E. Commersonii*.
 - Heads 200-300-flowered. Here may be sought. 81. *E. nemorosum*.
 - a. Leaves palmately 3-7-nerved from or somewhat above the base, or subpinnately veined, but with one of the lower pairs of veins considerably longer or thicker than the others
 - h. Heads 4-7-flowered
 - i.

- i. Leaves velvety-puberulent to tomentose beneath.
 - Leaves entire, rounded at base..... 40. *E. trachyphyllum*.
 - Leaves crenate-dentate, cordate at base..... 24. *E. glomeratum*.
- i. Leaves glabrous beneath *j.*
 - j.* Leaves 4-10 cm. long or more.
 - Leaves broadly ovate, thin, rounded or cordate at the wide base..... 41. *E. acuminatum*.
 - Leaves ovate-lanceolate to elliptical, thickish, acute at the base.
 - Heads sessile on the flexuous ascending branches of an ample racemose panicle; leaves elliptical, reticulated on both surfaces..... 42. *E. crenulatum*.
 - Heads in dense round-topped corymbs.
 - Involutional scales conspicuously arachnoid-ciliolate; leaves dull above, 1.5-2.3 cm. wide..... 34. *E. drepanoides*.
 - Involutional scales minutely and obscurely ciliolate; leaves lucid above, 3-6 cm. wide..... 35. *E. coelocaula*.
 - j.* Leaves small, less than 1 cm. in diameter, broadly ovate, obovate, or suborbicular..... 53. *E. incarum*.
 - h.* Heads 8-12-flowered *k.*
 - k.* Leaves lanceolate, ovate, or suborbicular, obtuse, rounded or cordate at base (in some cases very shortly acuminate at attachment of petiole) *l.*
 - l.* Leaves small (about 1.6 cm. long), obtuse. 55. *E. chamaedrifolium*.
 - l.* Leaves larger (4-12 cm. long), acute or acuminate, or conspicuously narrowed to a blunt apex *m.*
 - m.* Leaves rather deeply cordate with a triangular sinus; heads nearly sessile in globose glomerules. 24. *E. glomeratum*.
 - Leaves obtuse, rounded, truncate at base, or shallowly and broadly cordate; heads often crowded in compound corymbs but not in dense globose glomerules.
 - Petioles (of the mature cauline leaves) 17-32 mm. long.
 - Leaves at length rugose-bullate above, conspicuously reticulated beneath, the nerves connected by prominent and subregular cross-veins, these densely villous..... 43. *E. Stuebelii*.
 - Leaves membranaceous, neither bullate above nor prominently reticulated beneath..... 44. *E. callacatense*.
 - Petioles 8-10 mm. long.
 - Involutional scales broad, the intermediate and inner elliptical, stramineous, nearly smooth, 3-5-ribbed, the outer suborbicular, loosely pubescent..... 45. *E. urubambense*.
 - Involutional scales narrowly oblong, densely whitetomentose, obscurely 1-nerved..... 46. *E. leucophyllum*.
 - k.* Leaves rhombic-ovate or -lanceolate, acutish to acuminate or attenuate at base.
 - Leaves merely acutish at base and definitely petioled, soft-pubescent above, glandular-punctate and puberulent beneath..... 31. *E. helianthifolium*.
 - Leaves attenuate at base to an often short and obscure petiole, somewhat scabrous to tomentose above, densely canescent-tomentose beneath..... 47. *E. inulaefolium*.

- h.* Heads 14-30-flowered *l.*
- l.* Perennial herbs or shrubs *m.*
 - m.* Leaves rhombic-ovate, attenuate to a subsessile base 47. *E. inulaefolium.*
 - m.* Leaves ovate-lanceolate to suborbicular, obtuse, rounded, or cordate at base.
 - Leaves pubescent or scarious above.
 - Middle and outer involucral scales acute.
 - Heads rather few and loosely disposed in open panicles; pubescence of short light-colored hairs neither gland-tipped nor conspicuously jointed. 48. *E. gracilellum.*
 - Heads many, glomerate at ends of branches of an open panicle, pubescence dense, dark, purplish-brown, the hairs perceptibly dark-jointed. 49. *E. Cookii.*
 - Middle and outer involucral scales obtuse or rounded at the tip. 56. *E. marrubiifolium.*
 - Leaves glabrous above, and merely puberulent on the nerves and veins beneath. 50. *E. marginatum.*
 - l.* Delicate annual; leaves slender-petioled. 51. *E. microstemon.*
- h.* Heads 45-100-flowered.
 - Heads numerous, glomerate or at least crowded at the ends of the branches in a leafy-bracted panicle; pedicels mostly 0-3 mm. long. 30. *E. Lobii.*
 - Heads numerous, in an open loose panicle; pedicels mostly 1-2 cm. long; involucral scales multistriate. 52. *E. vitalbae.*
 - Heads in few (mostly 1-5)-headed corymbs; pedicels 5-20 mm. long; involucral scales 3-ribbed. 16. *E. tahanense.*

12. *E. PERSICIFOLIUM* HBK. Nov. Gen. et Spec. iv. 130 (1820); Ball, Jour. Linn. Soc. xxii. 43 (1885); Robinson, Proc. Am. Acad. liv. 350 (1918). *E. arboreum* HBK. l. c. 131; Robinson l. c. 351. *E. compactum* Benth. Bot. Sulph. 112 (1844).—LIMA: Huamantango, Barclay (K., phot. Gr.); Obrajillo, Wilkes Exp. (Gr.); Chicla, Ball, acc. to Ball, l. c. ANCACHS: Prov. Cajatambo: on grassy plains with numerous scattered bushes, alt. 3400-3700 m., Ocros, 28 March, 1903, Weberbauer, no. 2682 (Berl., fragm. Gr.). CUZCO: Ollantaytambo, alt. 3000 m., Cook & Gilbert, nos. 330 (U. S.), 335 (U. S.); Piñasniocj, Panticalla Pass, alt. 3600 m., Cook & Gilbert, no. 1809 (U. S.).

In a recent paper the writer, l. c., endeavored to maintain *E. arboreum* HBK. as distinct from *E. persicifolium*, but the characters are so slight that it now seems impossible to keep these species satisfactorily apart or key them from each other with any clearness whatever. [Ecuad.]

13. *E. BUDDLEAEFOLIUM* Benth. Pl. Hartw. 135 (1844); Robinson, Proc. Am. Acad. liv. 350 (1918).—AMAZONAS: Prov. Chachapoyas, Mathews (Gr.). [Ecuad.]

14. *E. DISCOLOR* DC. Shrubby; branches flexuous, slender, hexagonal, nearly smooth; leaves opposite, oblong-lanceolate, acuminate,

acute at base, slightly revolute and obscurely crenulate (at first sight entire), above glabrous but finely bullate-rugulose, beneath closely cinereous-tomentose, feather-veined (the veins 22-28 on each side, somewhat darker than the rest of the surface), about 9 cm. long, 1.5-2.5 cm. wide; petiole about 8 mm. long; corymbs terminal, few-headed, rather dense, 3-5 cm. in diameter, convex; heads about 25-flowered, short-pedicelled; involucre several-seried, subturbinate-campanulate; scales acute, ciliate; achenes roughened on the angles.—Prod. v. 161 (1836).—HUANUCO: near the city of the same name, Haenke (DC., phot. Gr.). The locality was cited by DeCandolle under the unrecognized name "Huanaceria," but it seems probable that this was a mere misreading of Huanuco, formerly spelled Huanacco, where Haenke did much of his work. The species is closely related to *E. persicifolium* HBK., but the leaves are cuneate at base, more decidedly discolored, and nearly entire.

15. *E. SALVIA* Colla. Shrub 8-10 dm. high, somewhat sticky on the younger parts; branches subterete, somewhat ribbed (when dried), purplish-brown to buff, at first granular-puberulent, soon glabrate, ascending, usually very leafy, terminating in compound round-topped corymbs; leaves (often proliferous in the axils) lanceolate, gradually narrowed from below the middle to a sharp point, irregularly dentate (teeth small, obtuse or merely acutish), of firmish texture but rather thin, feather-veined, rounded or obtusish at base, above glabrous and bullate, beneath finely reticulated, paler, more or less arachnoid-puberulent but often nearly or quite glabrate and pale-green, 5-8 cm. long, 1.5-2.4 cm. wide; petiole 2-8 mm. long, slender; corymbs 3-8 cm. in diameter, somewhat peduncled (i. e. uppermost leaves reduced and bractlike); heads 16-19-flowered, 1.3 cm. high, 8 mm. in diameter, pedicelled; involucral scales 16-20, graduated, 2-3-seriate, partly purplish-tinged, the outer ovate, somewhat viscid-pubescent, the inner lance-oblanceolate to linear, nearly glabrous, finely nerved; corollas purple, 6 mm. long, glabrous; achenes 4.3 mm. long, slender, obscurely puberulent, with dark concave faces and lighter-colored ribs, 4.3 mm. long; pappus-bristles about 46, often purple-tinged.—Mem. Tor. xxxviii. 8 (1835); Gay, Fl. Chil. iii. 473 (1847); Reiche, Fl. Chil. iii. 264 (1901). *E. reticulatum* Hook. & Arn. Bot. Beech. 29 (1830), not Desv.—PERU WITHOUT LOCALITY: Hayne (Berl.). [Chile.] VERNACULAR NAME: *Salvia Macho*, acc. to Gay, l. c.

16. *E. TAHONENSE* Hieron. Suffruticose, attaining 1 m. in height; branches round, at first sticky-glandular; lower internodes 1-2.5 cm. long, the upper as much as 7 cm. in length; leaves opposite, ovate,

acutish or obtusish, cordate at base but with a short acumination at the insertion, subcrenate-dentate (teeth 15-20 on each side, the largest 1.5 mm. high, 2.5 mm. broad, with revolute mucro), above slightly roughened in age and somewhat bullate, beneath loosely glandular-tomentulose, 3-nerved from the very base, about 4 cm. long, 2.25 cm. wide; corymbs about 5-headed from the axils of the upper leaves; heads 70-100-flowered, on sticky-glandular pedicels (5-20 mm. in length); involucre campanulate, 3-4-seriate; scales 40-55, the inner densely glandular, lance-linear, acute, the outer gradually shorter and broader, acuminate, ovate-oblong, 5-7-nerved at the base, the nerves anastomosing; corollas about 5.5 mm. long, scarcely ampliated toward the summit, glabrous; style-branches moderately thickened; achenes brown, 4 mm. long, roughened throughout; pappus-bristles 30-40, dirty-white.—Hieron. in Engl. Bot. Jahrb. xl. 372 (1908).—CAJAMARCA: below the Hacienda La Tahona near Hualgayoc, alt. 2600 m., Weberbauer, no. 4037. Not seen by the writer, the description here compiled with condensation from the original character.

17. E. PSEUDARBOREUM Hieron. Shrub; branches somewhat hexagonal, glabrous, grayish-brown, when young viscid and slightly vernicose; internodes 1-5 cm. long; leaves opposite, lanceolate to lance-oblong, acuminate, serrulate except near the cuneate base (teeth about 0.7 mm. high, 1-1.5 mm. wide), feather-veined (chief veins about 15 on each side), deep green, smooth, lucid, and nearly glabrous above, beneath olive-green, puberulent on the prominent and reticulated veinlets, chartaceous-membranaceous, 7-10 cm. long, 2.4-3.5 cm. wide; petiole slender, about 1 cm. long; corymbs terminal on the branches, together forming a leafy panicle; heads about 14-flowered, on puberulent pedicels (2-5 mm. long); involucre 3-4-seriate, graded, ovate to lanceolate, acute, ciliate, green, with 3-5 pale ribs; corollas glabrous, slender, slightly and gradually enlarged upwards, 5 mm. long; achenes yellowish-brown, ciliolate on the angles, 3.3 mm. long (scarcely mature); pappus-bristles about 40, whitish with a slight yellow tinge, nearly smooth.—Hieron. in Engl. Bot. Jahrb. xxxvi. 469 (1905).—CAJAMARCA: Callacate, May, 1879, von Jelski, no. 766 (Berl. fragm. Gr.).

18. E. GAYANUM Wedd. Shubby, 1 m. high; branches slender, ascending, nodulose after the fall of the leaves, at first closely enveloped in a yellowish-white wool, at length nearly glabrate, brownish, terete; internodes 5-35 mm. long; leaves opposite, subsessile crowded on the branchlets, linear, 3-5 cm. long, about 2 mm. wide, obtusish, grayish-pubescent and somewhat bullate above, densely covered beneath with yellowish-white wool; margins revolute, apparently entire; cymes loose,

terminal or somewhat lateral, 3-5-headed; pedicels woolly, 5-15 mm. long, filiform, mostly recurved; heads rather large, 1.3 cm. high, about 1 cm. in diameter; involucre narrowly campanulate, the scales lanceolate, attenuate, the inner long, stramineous, smoothish, the outer progressively shorter, rather densely woolly; corollas glabrous, greenish (Weberbauer), 8-10 mm. long, the style-branches clavate, purple; achenes (immature) pale, 4 mm. long, slightly hispidulous on the angles. — Chlor. And. i. 216, t. 40A (1857). — CUZCO: on mountains, *Gay*, acc. to Wedd. l. c. JUNIN: calcareous rocks, alt. 3700-4000 m., between Tarma and La Oroya, Feb., 1903, *Weberbauer*, nos. 2524 (Berl.) and 2583 (Berl., fragm. Gr.).

19. E. *BALLII* Oliver. Similar to the preceding in habit and inflorescence; leaves narrowly lance-oblance, acute, cuneate at the sessile base, 5-8 cm. long, 7-13 mm. wide, thinish, sparingly arachnoid and finely bullate above, paler and sparingly sordid-woolly beneath; cymes loose, few-headed; heads large, 1.5-1.8 cm. long, mostly nodding on slender (at maturity) dark glandular-puberulent pedicels; involucral scales ovate-elliptic, acuminate, thin, finely many-striate, 3-5-seriate, graduated, the outer distinctly shorter and more woolly; florets as in the preceding. — Oliv. in Hook. Ic. xv. 49, t. 1462 (1884). — LIMA: on ledges of the Andes, near Chicha, alt. 3660-3965 m., *Ball* (Gr.).

20. E. *CURSONII* Robinson. Probably shrubby and with the habit of the two preceding species; branchlets round, slender, fusco-tomentellous, leafy toward the summit; internodes about 8 mm. long; leaves opposite, linear-lanceolate, attenuate to both ends, above slightly puberulent and bullate-rugulose; beneath paler, reticulate-venose, tomentose, 9 cm. long, 8 mm. wide, thickish, the margin strongly revolute, slightly crenulate; petiole about 1 mm. long; heads in terminal 3-headed cymes, about 80-flowered, very large for the genus, 2.5 cm. long about equally thick; pedicels slender (short in fragmentary type but with greater maturity presumably elongating); involucral scales much imbricated in 3-5 series but not graduated as to length, lanceolate, acute, the outer thickish, 2 cm. long, 4 mm. wide, finely striate, granular-puberulent on the back, subherbaceous, scarious-margined; the inner narrower, smoother and more stramineous; receptacle apparently somewhat paleiferous toward the edge; pales very narrow, filiform-attenuate; corollas 1 cm. long, slenderly tubular, glabrous; style-branches, clavate, somewhat flattened, dark purple; achenes 7 mm. long, slightly roughened on the angles; pappus-bristles about 50, some of the outer shorter. — Proc. Am. Acad. xlii. 38 (1906). — AREQUIPA: Arequipa, *Curson* (Brit. Mus., phot. Gr.). — Known only from a single

branch bearing a few leaves and a very large, fairly mature head flanked by two heads still in bud.

21. *E. LAVANDULAEFOLIUM* DC. Slender branched shrub; branches suberect, when young densely clothed with yellowish-white wool; internodes 2-4 cm. long; leaves opposite, subsessile, linear, entire, slightly narrowed to an obtusish point, strongly revolute on the margins, 2-3 cm. long, 1.3-3.4 mm. wide, above glabrate, bullate-rugulose, beneath white-woolly; heads glomerate at the ends of the branches of small terminal panicles, subsessile, 9-10-flowered, about 8 mm. high; involucre narrowly campanulate, 3-4-seriate; scales graduated, thin, scarioso-stramineous, obtusish, the outermost somewhat woolly; corollas conspicuously granulate toward the limb.—*Prod. v. 154* (1836).—**PERU WITHOUT LOCALITY:** in valleys of the Andes, *Haenke* (Gr.), from South America, presumably Peru, *Dombey* (fragm. and sk. Gr.).

22. *E. CHOTENSE* Hieron. Erect branching shrub attaining 5 dm. in height; branches round, when young cinereous-tomentose, soon only sordid-arachnoid, internodes 2-7 (the uppermost as much as 12-15) mm. long; leaves opposite, shortly but distinctly petiolate, linear-oblong, obtuse, 3.4-4.5 cm. long, 4-6 mm. wide, distinctly feather-veined, the lateral veins 20 or more on each side, leaving the midnerve at a large angle (about 80°-85°), upper surface glabrous, lucidulous, bullate-reticulated, the lower gray-tomentose, margin strongly revolute and from the depressed veins appearing crenulate; corymbs compound, terminal, strongly convex subhemispherical, 3 cm. in diameter; heads 10-11-flowered; involucre subcylindric, multiseriate in the manner of § *Cylindrocephala* but of looser nature, the scales about 24, scarioso-stramineous, the inner purple-tinged toward the somewhat narrowed but at the apex rounded tips, the short outer scales webby-woolly; corollas glabrous, slightly enlarged upward, about 4 mm. long; achenes dark, nearly or quite smooth, about 2 mm. long.—*Hieron. in Engl. Bot. Jahrb. xxxvi. 466* (1905).—**CAJAMARCA:** between Chota and Cutervo, *von Jelski*, no. 794 (Berl., fragm. Gr.); near Cutervo, *von Jelski*, no. 631 (Berl., fragm. Gr.).

23. *E. VOLKENSII* Hieron. Branching shrub, attaining a height of 1 m. (Weberbauer) or 1.2-1.5 m. (Cook & Gilbert); branches at first slightly pubescent, at length glabrate; leaves opposite, linear-lanceolate, narrowed to an acutish or mucronulate tip, cuneate at base, crenate-serrate (teeth scarcely 1 mm. high, as much as 3.5 mm. wide), above scabrid-puberulent, beneath white-pubescent, feather-veined (the more prominent veins 8-10 on each side), chartaceous, 6-12 cm. long and 9-19 mm. wide, the reticulated veinlets depressed above, prominulent

beneath; petiole 1-4 mm. long; heads in terminal corymbs, 10-12-flowered, about 1 cm. high; involucre narrowly campanulate; scales about 20, dusky-stramineous, scarious, obtuse, slightly lacerate-ciliate toward the tip, the outer gradually shorter, about 5-nerved; corollas gradually enlarged toward the summit, scarcely 5 mm. long, glabrous, pale-blue or pale-purple; achenes dark, hispidulous on the angles and slightly so on the upper part of the faces; pappus-bristles 30-35, yellowish-white.—Hieron. in Engl. Bot. Jahrb. xl. 370 (1908).—CUZCO: on the hill Sacsahuamán, near Cuzco, alt. 3500-3600 m., Weberbauer, no. 4850; Ollantaytambo, alt. about 3000 m., Cook & Gilbert, nos. 369 (U. S.) and 589 (U. S.).

This species in habit and many essential characters is exceedingly close to *E. salicinum* Lam., of which it may ultimately prove a variety. However, the leaves are less thick and not so firm nor so deeply wrinkled; their margins are less strongly revolute, and the upper surface permanently hirtellous — the hairs (not readily visible except with a lens) being white, subpressed, and slightly tuberculate-thickened at the base. In *E. salicinum*, on the other hand, the leaves, even when young, are quite glabrous on the upper surface, which is strongly bullate-rugose and somewhat lucid. Furthermore, the achenes (at least in the form occurring in Colombia) are sparsely covered with short-stippled capitate glands. The flower-color in *E. Volkensii* was noted by Dr. Weberbauer as bluish, a statement questioned by Hieronymus. Cook & Gilbert give the flower-color of their no. 369 as "pale wistaria violet" and of their no. 589 as "pale blue." In the dried material of both of these numbers the limb and upper part of the throat of the corollas still show in the dried material a pale purple coloration.

In regard to the recorded Peruvian occurrence of *E. salicinum*, see below (p. 87).

24. *E. GLOMERATUM* DC. Suffruticose, shortly but rather coarsely spreading-pubescent; branches terete, leafy to the inflorescence; internodes 6 cm. or more long; leaves opposite, ovate-lanceolate, acuminate to scarcely acute, crenate-dentate except at base, where cordate by an open sinus, slightly pubescent above, softly but not very densely sordid-tomentose and somewhat veiny beneath, 4-6 cm. long, 2-3 cm. wide; petiole slender, 8-14 mm. long; globose glomerules 1-3 cm. in diameter, terminal on the divaricate branches of a leafy-bracted open ovoid or subpyramidal panicle; heads sessile, 7-8-flowered; involucre subcylindric-campanulate, the scales brownish-stramineous, striate, the inner oblong, obtuse, essentially glabrous, the outer progressively shorter, ovate, somewhat hairy dorsally near the blunt or rounded tip.—Prod.

v. 154 (1836).—LIMA: Obrajillo, *Wilkes Exp.* (U. S., phot. Gr.). Originally described from material from the herbarium of *Haenke* (DC., phot. Gr.), said by DeCandolle to have been found “inter Chilenses.”

25. E. GASCAE Robinson (p. 15). Robust, densely covered with spreading and jointed dark-brownish glandular hairs; leaves opposite, ovate, cordate, subacute, rather coarsely and evenly dentate, deep green, strongly bullate-rugose and puberulent above, somewhat paler, sordid-tomentose and conspicuously netted beneath, about 1 dm. long, 4–7 cm. wide; petiole densely dark-hairy, 2–4 cm. long; corymbs terminal, dense, sessile; heads about 22-flowered, 1.5 cm. high, 6 mm. thick; involucral scales about 21, greenish-straw-colored, ovate, acute, finely striate-ribbed; receptacle flat; corollas slender, gradually and very slightly enlarged toward the top; achenes 4 mm. long.—AMAZONAS: Prov. Chachapoyas, *Matheus* (Gr.). A very marked species with foliage suggesting some of the coarser *Salvias*. In habit and inflorescence recalling § *Conoclinium*, but with a flat receptacle.

26. E. ANISODONTUM Robinson (p. 6). In habit, foliage, and pubescence similar to the preceding, but leaves triangular-hastate, caudate-acuminate, with unequal teeth (some short and rounded, others 2–3 times as long and acutish), basal sinus deep and narrow; corymb pedunculate, strongly convex, congested; heads about 10-flowered, 1 cm. long; involucre cylindric-campanulate; corollas 6 mm. long, smooth; achenes 4 mm. in length, glabrous.—AMAZONAS: Prov. Chachapoyas, 1836, *Matheus*, no. 87 H (K., phot. and fragm. Gr.).

27. E. ENDYTUM Robinson (p. 13). A stoutish shrub, 1–2 m. high, covered with a short, dense and somewhat matted reddish-brown velvety pubescence; stems round, hollow, leafy well into the large opposite-branched ovoid panicle; leaves opposite, oblong-ovate, acute, serrulate, feather-veined, thickish-membranaceous, tomentellous on both surfaces, paler beneath, 8–12 cm. long, 3.6–6 cm. wide; petiole 1.5–2 cm. long, densely rusty-velvety; heads crowded at the ends of the widely spreading branches of the panicle, about 39-flowered, 7 mm. high and thick; involucre campanulate, 2–3-seriate; scales scarcely graded, acutish, obscurely nerved, the outer ovate, persistent, dorsally tomentellous, the inner narrower, subglabrous, promptly deciduous; corollas 3.5 mm. long, smooth; achenes glabrous; pappus-bristles about 20, somewhat unequal, nearly as long as the corolla.—PUNO: between Sandia and the tambo Azalaya, on the road from Sandia to Chunchusmayo, in bushy places alt. 1500–2000 m., *Weberbauer*, no. 1074 (Berl., phot. and fragm. Gr.).

28. E. TARAPOTENSE Robinson (p. 37). Rusty-tomentellous shrub; leaves opposite, elliptic-ovate, acuminate, remotely serrate (teeth about

1 mm. high and 1 cm. apart), rounded at base, coriaceous feather-veined, above sparingly pubescent, lucid, deeply rugose-reticulated, beneath paler, pubescent and minutely atomiferous, 4-8 cm. long, 1.5-4 cm. wide; petiole about 1 cm. long; heads about 37-flowered, about 1 cm. high and thick, densely cymose at the ends of the leafy-bracted branches in an open panicle; involucre campanulate; scales about 18, clearly graduated, acutish, distinctly striate-costulate; corollas about 6 mm. long, with slightly but clearly enlarged throat.—LORETO: in mountains along the river Mayo, near Tarapoto, *Spruce*, no. 4014 (Gr.).

29. E. MATHEWSII Robinson (p. 23). Tawny-velvety, probably shrubby (the base unknown); stems and branches terete, leafy to well within the inflorescence; internodes 3-6 cm. long; leaves opposite, lanceolate, caudate-acuminate, attenuate to a relatively short-petioled base, remotely and rather sharply 4-6-toothed on each side (teeth 1-2 mm. long, about 1.5 cm. apart), feather-veined, 1 dm. long, 2 cm. wide, above sparingly tawny-pubescent on the midrib, the surface otherwise subglabrous, somewhat shining, the reticulated veinlets depressed, beneath rusty- or tawny-pubescent or subtomentose, paler, the veinlets slightly prominent; panicle leafy; the heads crowded at the ends of the branches, about 56-flowered, nearly 1 cm. high and thick; involucre campanulate, about 3-ranked; scales ovate to (the inner) linear, acutish, striate-costate, glandular-ciliolate, the outer dorsally a little tawny-hairy; corollas 5.5 mm. long, slightly and gradually enlarged toward the summit, the upper part externally a little granulated; achenes dull-grayish, 2.3 mm. long; pappus-bristles about 25, white, scarcely roughened, about a third shorter than the corolla.—DEPARTMENT NOT ASCERTAINED: at Yambbrasbamba (an unidentified name perhaps not correctly read from a somewhat obscure label), 1835, *Mathews* no. 1386 (K., phot. Gr.).

30. E. LOBBII Klatt. Shrub; branches round, striate-costulate (after drying), fistulose, densely purplish- or later tawny-tomentose (at last subglabrate), the hairs slender, spreading, attenuate, purple-jointed; internodes 3-7 cm. long; leaves rhombic-ovate, attenuate to a slightly obtusish apex, abruptly cuneate at the base, quite entire or undulate-dentate (with 3-6 low broad irregular rounded teeth on each side), 7-9 cm. long, 2.8-3.5 cm. wide, membranaceous, dark-green and finely tawny-pubescent above, paler, tawny-tomentellous beneath, 3-nerved from a point about 1 cm. above the base; petiole about 1.2 cm. long, panicle ovoid, opposite-branched, leafy-bracted, 1.3-2 dm. in height and diameter; heads clustered at the ends of the branches, 1 cm. high and thick; involucre campanulate, 2-3-seriate; scales moderately

graduated, 2-ribbed and 3-nerved, the inner stramineous, acutish, tawny-tomentellous toward the tip, the outer oblong, round-tipped, subherraceous, dorsally tawny-tomentellous; corollas slenderly tubular, without evident throat, glabrous, 5.5 mm. long; achenes 2.8 mm. long, slender, tapering downward, fuscous, upwardly setulose toward the summit; pappus-bristles about 30, dull-white, nearly smooth, almost equalling the corolla.—Ann. Naturh. Hofmus. Vienna, ix. 356 (1894). *E. sordescens* Bak. in Mart. Fl. Bras. vi. pt. 2, 306 (1876), in part, not DC.—LORETO: in mountains along the Mayo River, near Tarapoto (incorrectly given by Klatt as Jarapoto), Spruce, no. 4804 (Gr.). WITHOUT EXACT LOCALITY: *Lobb* (Hofmus. Vienna, sk. and fragm. Gr.).

This is one of several widely different plants included by Baker under *E. sordescens* DC., which in its typical form is a pretty well marked species of Atlantic Brazil with much smaller (about 25-flowered) heads, linear and acute involucral scales, and petioles (as stated by DeCandolle) 1.8–2 cm. long. The real *E. sordescens* seems to be well represented by Riedel's no. 1348 (Gr.) determined by Schultz-Bipontinus.

31. *E. HELIANTHIFOLIUM* HBK. Shrubby; branches opposite, round, dark-hispid; internodes 4–6 cm. long; leaves opposite, ovate, narrowed from below the middle to an acute point, serrate except toward the abruptly pointed base (teeth 1–1.7 mm. high, 4–6 mm. wide, mostly acute), feather-veined, membranaceous, above scabrid, beneath hispid with minute hairs and closely beset with orange-colored glands, the largest leaves about 12 cm. long, 5 cm. wide; petiole subterete, densely hispid, canaliculate above, 7–10 mm. long; inflorescence a trifid very leafy flattish panicle; heads pedicellate, about 10-flowered, 8 mm. high; involucre campanulate-cylindric, the scales about 16, imbricated, but not very strongly or regularly graduated, the inner oblong-linear, smoothish, obtuse, the outer somewhat shorter, oblong, acutish, hispidulous.—Nov. Gen. et Spec. iv. 127 (1820).—PIURA: near Ayavaca, Humboldt & Bonpland (Par., phot. Gr.).

From the photograph in the Gray Herbarium this species appears to resemble in habit the variable *E. inulaefolium* HBK. The leaves, however, appear to be more regularly feather-veined, the petiole more sharply defined, and the inflorescence more leafy. From the original character it is to be inferred that the pubescence is more hispid and of darker color. The type-material is immature and until rediscovery the status of this species must probably remain doubtful.

32. *E. VESTITUM* Poepp. Erect shrub with terete somewhat flexuous leafy branches; pubescence on younger axes, as well as on the midrib and chief veins of the leaves short, dense, rusty-velvety; leaves petiolate,

opposite, ovate-elliptic, acuminate, serrate, except toward the obtuse or rounded base (teeth 0.4–0.7 mm. high, 4.5–7 mm. wide), feather-veined (chief veins about 5 on each side, leaving the midnerve at an angle of 60°–65° and curving forward), reticulate-veiny, above scabrid, dark-green, beneath pubescent, paler, membranaceous, 12–15 cm. long, half as wide; petiole densely rusty-velvety, 8–25 mm. long; corymbs pedunculate, raised well above the leaves, compound, rounded, the branches wide-spreading; 1.5–4.5 cm. in diameter; heads short-pedicelled, about 7.5 mm. high; involucre campanulate; scales 2–3-seriate, graduated, the outer apparently ovate-oblong, narrowed to an obtusish apex; corollas white, scentless.—Poepp. in Poepp. & Endl. Nov. Gen. ac Spec. iii. 55 (1845).—ANCACHIS (or possibly HUANUCO) in mountain woods at Pampayaco (Cuchero), Poeppig (Hofmus. Vienna, phot. Gr.).

33. *E. ORGYALOIDES* Robinson (p. 24). Shrub or tall herb with slender dark-brown branches, nearly smooth and leafy to the inflorescence; internodes 4–6 cm. long; leaves opposite, lance-oblong, acuminate at each end, undulate-margined and remotely cuspidate-denticulate, chartaceo-membranaceous, feather-veined, glabrous and delicately net-veined on both surfaces, a little paler beneath, the largest 1.6 dm. long, 6 cm. wide; petiole minutely dusky-puberulent 4–7 mm. long; panicle broadly pyramidal, leafy-bracted below, its slender opposite branches widely spreading and flowering only toward the tip; heads about 20-flowered, 4.5 mm. high and thick; involucre bell-shaped, dusky- or greenish-stramineous, the scales imbricated but not very clearly graduated, ciliolate but otherwise glabrous, the inner oblong to linear, the outermost ovate, acuminate, often recurved at the tip; corollas glabrous, only slightly and gradually enlarged upward, 2.5 mm. long; achenes (immature) 1.7 mm. long, glabrous; pappus dull-white, 2 mm. long, the bristles about 30.—LORETO: near Tarapoto, 1855–56, Spruce, no. 4546 (K., phot. Gr.).

In many respects near the preceding, but with essentially glabrous stems and obscurely toothed, or subentire leaves acuminate at the base.

34. *E. DREPANOIDES* Robinson (p. 12). Glabrous shrub reaching a height of 4 m.; branches nearly round, curved-ascending, leafy; internodes 1–2 cm. long; leaves opposite, lanceolate, broadly scythe-shaped, acuminate, acute at base, serrate (teeth 0.6 mm. high, 2–3 mm. wide), firmish, above flat, dull, sprinkled with fine granules, beneath slightly paler, 3-nerved above the base, then feather-veined, 7–9 cm. long, 1.8–2.1 cm. wide; petiole glabrous, about 2 cm. long; corymbs terminal, sessile, compound, rounded, 1 dm. or more in

diameter; branchlets and pedicels webby-puberulent; heads many, about 7-flowered, 6 mm. (very immature) high, 3.5 mm. in diameter; involucral scales about 13, ovate-oblong, acutish, finely striate, stramineous with purplish tinge, graduated, webby-ciliate; corollas slenderly tubular, 5-nerved, granulated; achenes tapering downward, finely granulated; pappus-bristles about 23.—ANCACHS: open woods by a brook at Comin, Prov. Huari, alt. 3600-3700 m., *Weberbauer*, no. 2918a (Berl., phot. and fragm. Gr.).

35. *E. COELOCAULE* Robinson. Shrubby; branches stout, round, grayish-brown, at length glabrous, smooth, hollow; internodes 3-4 cm. long; leaves opposite, lance-oblong or rhombic-lanceolate, long-acuminate, serrate (except at the cuneate base), feather-veined, of firmish texture, at maturity green, glabrous, and somewhat shining above, somewhat glaucous and puncticulate beneath; petiole 1-4 cm. long, smooth, reddish; upper leaves smaller, lanceolate, entire; corymb terminal, sessile, compound, slightly convex, 1-1.5 cm. broad, densely covered with a short and curly fulvous tomentum; heads very numerous, shortly pedicelled or sessile by 2's or 3's, about 5-flowered, 10-12 mm. high, 2-3 mm. thick, slenderly cylindrical; scales about 12, stramineous, about 3-seriate, the outer ovate, acutish, the inner gradually longer, narrowly elliptical, delicately striatulate, obtusish, glabrous; corollas smooth, slightly enlarged upward, 7 mm. long; achenes dark, shining, obsoletely granulate; pappus-bristles about 30, unequal, yellowish-white.—AMAZONAS: Prov. Chachapoyas, *Mathews*, no. 1373 (K., phot. and fragm. Gr.).

36. *E. AMYGDALINUM* Lam. Eneyc. ii. 408 (1786); Hieron. in Engl. Bot. Jahrb. xxxvi. 470 (1905); Robinson, Proc. Am. Acad. liv. 301, 339 (1918). *E. dodoneaeifolium* DC. Prod. v. 161 (1836). *E. fraternum* DC. l. c. 163.—LORETO: near Tarapoto, *Spruce*, no. 4116 (Gr.). SAN MARTIN: open grassy plains at Yurimaguas, Prov. Maynas, *Poeppig*, no. 2075 (DC., phot. Gr.). CAJAMARCA: Tambillo, *von Jelski*, no. 728, acc. to Hieron. l. c. CUZCO: Santa Ana, alt. 900 m., *Cook & Gilbert*, no. 1613 (U. S.). ANCACHS: on open hills at Cuchero, *Poeppig*, no. 18 (DC., phot. Gr.). WITHOUT LOCALITY: *Mathews* (N. Y.). The original specimen of *E. amygdalinum* said to have been collected in Peru by Joseph de Jussieu is still extant (Par., phot. Gr.), but probably came from what is now Ecuador. [Nicaragua to Bolivia and Brazil.]

37. *E. SPRUCEI* Robinson (p. 33). Low undershrub, 2-3 dm. high; stem curved-ascending and distinctly woody toward the soon defoliated base; internodes very short below; leaves opposite, oblance-

ceolate, sessile, attenuate to each end, rather remotely denticulate, green and glabrous above, paler and on the midnerve sordid-pubescent beneath, 5-10 cm. long, 1-1.8 cm. wide, thin, membranaceous, feather-veined, veins about 6 or 7 on each side, curved forward and anastomosing with each other; panicle terminal, its slender branches and filiform pedicels clothed with short dirty-brownish curly hairs; heads about 18-flowered, about 6 mm. high; involucre turbinate, several-seried, its scales stramineous, mostly linear-oblong, obtuse or rounded at the tip and often slightly tufted on the back near the summit, mostly 2-costulate; corollas 3 mm. long, glabrous; proper tube slender 1.8 mm. long, the throat 1.2 mm. high, turbinate; style-branches with flexuous very delicate attenuate and papillose appendages; achenes blackish, 1.5 mm. long, sparingly hispidulous on the angles; pappus-bristles about 25, very delicate, nearly smooth, white.—LORETO: along the Huallaga River, *Spruce*, no. 4167 (Gr.).

38. *E. PILLUANENSE* Hieron. Suffruticose, 5 dm. high; stems puberulent, striate; leaves opposite, elliptic- to rhombic-ovate, acute or obtuse, entire, cuneately narrowed below but cordate and half-clasping at the sessile base, chartaceous, puberulent above, densely tomentulose beneath, feather-veined (lateral veins 6-8 on each side, leaving the midrib at about 45° and then curved-ascending, connected by reticulation), the largest 12 cm. long, 4-4.5 cm. wide; panicle terminal, compound, leafy-bracted below; heads corymbose or subracemose toward the tips of the branches, some also borne directly from the axils of the bracts, pedicellate or more rarely sessile, 14-17-flowered; involucre about 4 mm. long, the scales about 20, obtuse, the inner linear-oblong, stramineous, 1-3-nerved and striate, the outer gradually shorter and broader, 4-nerved, the outermost ovate, about 3 mm. long; achenes about 1.5 mm. long, dark, smooth.—Verh. Bot. Verein Brand. xlviii. 201 (1907).—LORETO: Salinas de Pilluana, *Ule*, no. 6780.

This species has not been seen by the writer. The description is condensed from the original, in which the plant is said to be nearly related to *E. iresinoides* HBK. but to differ in its firmer more pinnately veined leaves, larger heads, and more numerous florets.

39. *E. COMMERMONII* (Cass.) Hieron. Nearly herbaceous, decumbent, rather densely grayish-pubescent, 3-5 dm. high; stem round, stoutish, curved-ascending, leafy below, nearly naked above the middle to the terminal, rather dense, often nodding inflorescence; leaves chiefly opposite, oblong, obtuse, 1 dm. long, 3 cm. wide, irregularly and coarsely serrate-crenate or lobed except on the long gradually cuneate

petiole-like entire base; heads short-pedicelled, in dense rounded corymb or at length loose irregular corymbose panicle, about 20-flowered; involucre campanulate, about 2-seriate, the inner scales oblong 2-3-ribbed and smoothish to the middle, ending in tomentellous and erubescence rounded slightly dilated tips of softer texture, a few of the outer scales progressively shorter and narrower, the outermost linear, acutish; corollas said to be red, glabrous, slightly and gradually enlarged upward; achenes dark, 2.5 mm. long, puberulent, tapering to a sharp villous base; pappus-bristles about 30, yellowish-white, barbellate.—Hieron. in Engl. Bot. Jahrb. xxii. 771 (1897). *Gyptis Commersonii* Cass. Dict. xx. 178 (1821). *Eupatorium Bacleanum* DC. Prod. v. 157 (1836). *Gyptis Commersoni* [Cass.] Bak. in Mart. Fl. Bras. vi. pt. 2, 314 (1876), in syn.—PERU WITHOUT LOCALITY (as "inter Peruanas"): *Haenke*, acc. to DeCandolle, l. c. [Southern Brazil, Uruguay, and Argentine.]

40. *E. TRACHYPHYLLUM* Hieron. Woody climber; branches round, closely clothed with a short and stiffish reflexed tawny pubescence, the hairs pointed, non-glandular; leaves opposite, ovate-oblong, caudate-acuminate, rounded at base, entire, concolorous, firmly membranaceous, 3-nerved from somewhat above the base, above dull green, scabrous-puberulent, rugulose-reticulated, beneath tomentellous especially on the prominent reticulation, mostly 7-12 cm. long, about a third as wide, petiole 1-2 cm. long, retrorsely velvety-puberulent; panicle branched at right angles, the branches naked except at the densely floriferous tip; heads 6-7-flowered, subsessile, numerous in close subglobose glomerules; involucres narrowly campanulate, scarious, stramineous, the scales very unequal, mostly linear-oblong, slightly ciliate toward the obtuse or rounded tip, 3-5-costulate, the inner promptly deciduous; corollas pale, probably flesh-colored, glabrous, slenderly tubular, slightly and gradually enlarged upward, 6 mm. long; achenes purplish-black 2.3 mm. long tapering toward the callose base, at the summit slightly constricted into a short neck bearing the pappiferous disk; pappus-bristles about 30, white with a light yellow tinge, barbellate.—Hieron. in Engl. Bot. Jahrb. xxxvi. 467 (1905).—CAJAMARCA: near Tambillo, 29 Aug., 1878, *von Jelski*, no. 697 (Berl., fragm. Gr.).

41. *E. ACUMINATUM* HBK. Nov. Gen. et Spec. iv. 107 (1820); Hieron. in Engl. Bot. Jahrb. xxxvi. 469 (1905); Robinson, Proc. Am. Acad. liv. 290 (1918).—CAJAMARCA: near Tambillo, 13 Aug., 1878, *von Jelski*, no. 790, acc. to Hieron. l. c. [Colombia.]

The writer has had no opportunity to verify the Peruvian record of

this species, indeed has seen no specimens of it except from central and southwestern Colombia where it appears to be abundant. If Hieronymus is correct in his identification, the plant of von Jelski extends the known range southward toward 1000 km.

42. E. CRENULATUM Spreng. Glabrous shrub, with ascending slender more or less flexuous purple branches leafy up to the loose terminal racemose panicle; leaves opposite, lance-oblong to rather broadly elliptic, acute or obtuse, cuneate at base, finely serrate, 3-nerved from the base, of firmly coriaceous texture, punctate, scarcely paler beneath, 5-7.5 cm. long, 1-3.5 cm. wide, 5-15 mm. long; heads very numerous, about 5-flowered, about 6 mm. high, shortly pedicelled, racemose disposed on long flexuous branches of a more or less pyramidal panicle; involucre subcylindric, of few purple-tinged stramineous very unequal elliptic-lanceolate firmish round-tipped scales, the inner paler, ciliolate, the outer darker and somewhat puberulous; corollas 4.5 mm. long, the proper tube slender, granulated, 2.5 mm. long, the throat definitely though not greatly enlarged, smoothish, limb short densely granulated on the outside; achenes at maturity black and shining, almost prismatic; pappus-bristles 25-30, firmish, stramineous, tapering from near the base, obscurely barbellate.—Spreng. ex Hieron. in Engl. Bot. Jahrb. xxii. 776 (1897). *Baccharis crenulata* Spreng. Syst. iii. 465 (1826). *Eupatorium dendroides* Bak. in Mart. Fl. Bras. vi. pt. 2, 321 (1876), excl. syn. *Mikania arborea* Kunth. For further synon. see Bak. l. c.—CUZCO: San Miguel, Urubamba Valley, alt. 1800 m., Cook & Gilbert, no. 1113 (U. S.). PERU WITHOUT LOCALITY: 1902, Weberbauer without number (Berl.).

This species is not closely related to any other in Peru. Its leaves recall those in some species of *Baccharis*, the genus to which it was first referred. [Brazil, Argentina, Bolivia.]

43. E. STUEBELII Hieron. in Engl. Bot. Jahrb. xxi. 329 (1895); Robinson, Proc. Am. Acad. liv. 288, 354 (1918).—AMAZONAS: Prov. Chachapoyas, Mathews (Gr.). This Peruvian specimen was identified with the type at Berlin by Dr. J. M. Greenman. [Ecuador, Colombia.]

44. E. CALLACATENSE Hieron. Suffruticose; branches slender, terete, spreading, flexuous, covered with short dense somewhat deflexed brownish-gray scarcely or not at all glandular pubescence; leaves opposite, ovate, acute, crenate-serrate except at the nearly truncate base (teeth 0.8-1.4 mm. high, 3-4 mm. wide), 3-nerved from a slightly acuminate attachment (the lateral nerves soon branched

on the outer side), dull-green above, slightly paler beneath, sordid-pubescent on both surfaces, 5 cm. long, 2.8-3.5 cm. wide; petiole slender, 2-2.5 cm. long; corymbs trifid, leafy-bracted at base, the bracts lanceolate, entire, petiolate; partial inflorescences rounded, rather dense, 2-4 cm. in diameter, the branchlets and filiform pedicels (1-3 mm. long) densely covered with a short brownish-gray pubescence; heads 5-6 mm. high, about 10-flowered; involucral scales about 15, obtuse, brownish-stramineous, somewhat scarious, the outer short, ovate, loosely-pubescent, the intermediate elliptic-oblong, 3-5-ribbed, slightly puberulent toward the tip; corollas about 4 mm. long, with slender proper tube 2 mm. long, slightly enlarged into a cylindric throat 1.7 mm. long; style-branches filiform, not clavate; achenes (very immature) 2 mm. long, grayish-pubescent; pappus-bristles about 30, delicate, white, distinctly shorter than the corolla.—Hieron, in Engl. Bot. Jahrb. xxxvi. 468 (1905).—CAJAMARCA: near Callacate, May, 1879, von Jelski, no. 670 (Berl., fragm. Gr.).

45. E. URUBAMBENSE Robinson (p. 38). Perennial herb or perhaps shrub (the base unknown); stems (or branches) erect, terete, purple, covered with fine white crimped puberulence; internodes 1.5- (the upper) 8-11 cm. long; leaves opposite, ovate-lanceolate, gradually narrowed from much below the middle to a mostly obtusish tip, crenate except toward the obtusish or rounded base (the teeth 0.7-1.5 mm. high, 3-4 mm. wide), 3-nerved from somewhat above the base (the lateral nerves quickly branching), thickish-membranaceous, dull-green, slightly rugulose and puberulent above, gray-tomentose beneath, 5-6.6 cm. long, 1.8-2.7 cm. wide; petiole 5-8 mm. long, slender except at the somewhat expanded base; corymbs trichotomous, leafy-bracted at the base (the bracts like the leaves only smaller, similarly crenate and petiolated); partial inflorescences dense, rounded, 3-6 cm. in diameter; heads about 10-flowered, about 8 mm. high, essentially sessile; involucre subcylindric-campanulate; the scales about 3-seriate, rounded at the summit, the outer very short, the intermediate broadly elliptical, brownish-stramineous, mostly 3-nerved and 4-costulate, somewhat margined, the innermost linear-oblong, slightly erose-ciliate at the blunt summit; corollas 4.8 mm. long, slenderly tubular, perceptibly constricted just above the base and sometimes slightly so just beneath the limb, glabrous; teeth lanceolate; style-branches filiform, scarcely clavellate; anthers with long narrow apical appendage; achenes fuscous, 2.6 mm. long, tapering downward, upwardly villous on the nerves; pappus-bristles about 28, lucid, yellowish-white, tapering, 4.3 mm. long, nearly smooth.—

Cuzco: Urubamba in the Valley of Ymay [?], *Pentland* (K., phot. and fragm. Gr.); Ollantaytambo, alt. about 3000 m., *Cook & Gilbert*, no. 336 (U. S.).

46. *E. LEUCOPHYLLUM* HBK. Distinctly shrubby, the stems, spreading-ascending terete branches, inflorescence, and under-surface of leaves closely white-woolly; leaves opposite, narrowly ovate, attenuate, acutish, crenulate, 3-nerved essentially from the rounded to subtruncate entire base, pale-green and very finely puberulent above, white-tomentose but with perceptibly darker nerves and reticulated veins beneath, 3-5 cm. long, half as wide; petiole about 1 cm. long; heads about 10-flowered, 5 mm. long, very numerous in rounded intricately branched corymbiform terminal panicles; involucre subcylindric-campanulate; the scales about 15, narrowly oblong, obtuse, very unequal, dorsally white-woolly, often with a single perceptible mid-nerve; corollas glabrate, 2 mm. long; proper tube shorter than the gradually enlarged throat; achenes glabrous, shining, 1.7 mm. long; pappus-bristles, whitish, essentially smooth.—Nov. Gen. et Spec. iv. 115 (1820); Benth. Pl. Hartw. 135 (1844); Jameson, Pl. Aeq. ii. 82 (1865).—Although generally attributed to Peru and with scarcely a doubt extending into the northern part of the country, this plant seems never to have been collected south of the present boundary of Ecuador, the only collections known to the writer being in favored spots of the temperate region of the Andes near the villages Cajanuma and Gonzanama, alt. 1976 m., *Humboldt & Bonpland* (Par., phot. Gr.), and in mountains of Loja, *Hartweg*, no. 756. Of the latter collection (though unnumbered) there is a specimen in the herbarium of the New York Botanical Garden.

This species was by oversight omitted from the writer's recension of the Eupatoriums of Ecuador. It is closely related to *E. niveum* but may be distinguished by its more attenuate leaves which are dull and finely pubescent above instead of being green, glabrous, and lucid as in *E. niveum*. In *E. leucophyllum* the involucral scales are thicker, narrower, more densely tomentose, and less scarious than in *E. niveum*. *E. leucophyllum* furthermore gives the impression of being rather the more xerophytic of the two.

47. *E. INULAEFOLIUM* HBK. Nov. Gen. et Spec. iv. 109 (1820); Hieron. in Engl. Bot. Jahrb. xxii. 765 (1897), which see for synon.; Robinson, Proc. Am. Acad. liv. 291 (1918). *E. decemflorum* DC. Prod. v. 154 (1836); Poep. in Poep. & Endl. Nov. Gen. ac Spec. iii. 54 (1845); Klatt in Engl. Bot. Jahrb. viii. 34 (1887).—Cuzco: Santa Ana, alt. about 900 m., *Cook & Gilbert*, no. 1633 (U. S.). HUAN-

UCO: in bushy places at Cassapi, *Poeppig*, no. 30 (DC., phot. Gr.). WITHOUT INDICATION OF DEPARTMENT: *Haenke*, acc. to DC., l. c.; in Andes of Peru, *Wasner* [doubtfully legible], no. 1349 [apparently of the Mathews series] (N. Y.); *Mathews*, without number (Gr.).

Forma SUAVEOLENS (HBK.) Hieron. in Engl. Bot. Jahrb. xxix. 11 (1900), xxviii. 572 (1901), xxxvi. 470 (1905); Robinson, Proc. Am. Acad. liv. 292 (1918). *E. suaveolens* HBK. Nov. Gen. et Spec. iv. 109 (1820).—CAJAMARCA: near Tambillo, 7 August, 1878, *von Jelski*, nos. 692, 742, acc. to Hieron. l. c. xxxvi. 470. [Ecuad., Colomb., Venez.]

48. *E. GRACILENTUM* Robinson (p. 18). Slender perennial herb 3–4 dm. or more high; root of a few strong slender lignescent elongated fibres; stems 1–several from the base, erect, or at least decumbent, terete, purplish, 1–2 mm. in diameter, sordid-puberulent or -tomentous; internodes 2–11 cm. long; leaves opposite, deltoid-ovate, acute to acuminate, crenate-dentate except at the rounded, truncate or subcordate base, 1.8–3 cm. long, 1.1–2.3 cm. wide, thin, membranaceous, softly pubescent above, grayish-tomentose beneath, 3-nerved from the insertion; petiole slender, subterete, gray-pubescent, 4–8 mm. long; heads about 25-flowered, 6 mm. long, 3.7 mm. in diameter, borne in loose irregular 1–5-headed cymes at the ends of the spreading branches of an open leafy-bracted panicle; involucre narrowly campanulate, scales about 19, about 3-seriate, stramineous, the inner narrowly lance-elliptic, obtuse, smoothish, 2–3-costulate, scarious-margined; the intermediate and outer progressively shorter, ovate-lanceolate, acute to acuminate, brownish-puberulent; corollas probably white, glabrous except at the short limb; proper tube 0.7 mm. long, throat slightly enlarged, cylindrical, 2.3 mm. long; style-branches filiform, scarcely at all clavellate, achenes 1.5 mm. long, fuscous-brown, with lighter-colored obscurely hispidulous ribs; pappus-bristles about 27, delicately capillary, white, essentially smooth.—PERU WITHOUT INDICATION OF LOCALITY: *Mathews* (N. Y., phot. Gr.). Like several other specimens of Mathews's Peruvian plants from the herbarium of Meissner, two sheets of this plant, now in the herbarium of the New York Botanical Garden, bear a yellow label in the hand of Meissner, reading merely "Peruvia Matthews, 1862." Alexander Mathews, the well-known collector in Peru (who spelled his name with one *t*) died in 1841. It has been impossible to get information of any subsequent collector in Peru of this name and it is accordingly inferred that errors have here arisen in the copying of labels, and that these plants were in reality collected by Alexander Mathews about 1835–1840.

49. *E. COOKII* Robinson (p. 9). Shrubby, densely spreading-villous, the hairs at first long, soft, and under a lens beautifully purple-jointed; stems round, purple, the internodes elongated, sometimes 13 cm. or more in length; branches spreading, usually curved upward, bearing about 2 pairs of leaves and terminating in a mostly dense trifid corymb; leaves ovate, acuminate, crenate-serrate except at the rounded, or subcordate base, dull-green and sparingly pubescent above, slightly paler, sordid-villous and somewhat glandular-atomiferous beneath, about 5 cm. long and 3-3.4 cm. wide; petioles 1.2-2 cm. long; corymbs trifid, dense; pedicels short, woolly, with long soft brown and jointed hairs; heads crowded, about 20-flowered, about 7 mm. high, 4 mm. in diameter; involucres campanulate, about 3-seriate, substramineous, the scales about 19, lance-oblong, acute, mostly 2-ribbed and 3-veined, dorsally pubescent, the innermost narrower, less pubescent, obtusish or rounded at the more or less scarious summit; corollas apparently white, hispidulous on the limb, otherwise essentially glabrous, about 3.8 mm. long, the proper tube only 0.7-0.8 mm. long, much exceeded by the cylindrical throat; achenes dark brown, nearly black, 1.5 mm. long, glabrous; pappus-bristles about 40, clear white, scarcely roughened.—Cuzco: in the Lucumayo Valley, alt. 1800-3600 m., *Cook & Gilbert*, no. 1352 (U. S., phot. Gr.). JUNIN: Andamarca, *Mathews*, no. 1126 (K., phot. and fragm. Gr.), a doubtful form with shorter pubescence and more distinctly cordate leaves, with crenate rather than serrate margins.

50. *E. MARGINATUM* Poepp. Climbing shrub; branches round, slender, divaricate as they leave the stem, but curved-ascending, very finely puberulent; internodes 4-7 cm. long; leaves opposite, lance-ovate, acuminate, serrate, except at the rounded base, 3-4.5 cm. long, 1.2-2.4 cm. wide, membranaceous, 3-nerved essentially from the base, glabrous except for a delicate puberulence on the nerves beneath; the margin narrowly revolute and slightly indurated; petiole slender, 5-10 mm. long; panicle opposite-branched, leafy-bracted, ovoid, open, about 4 dm. long; heads small, about 15-flowered, slender-pedicelled, in convex fairly dense terminal corymbs on the branchlets of the finely puberulent composite inflorescence; involucral scales about 3-seriate, narrowly oblong, stramineous, the inner glabrous, obtuse, the outer pubescent: corollas white; achenes glabrous.—Poepp. in Poepp. & Endl. Nov. Gen. ac Spec. iii. 54 (1845).—HUANUCO: in bushy places at Cassapi, August, *Poeppig*, no. 1254 (Hofmus. Vienna, phot. Gr.). This species has somewhat the habit of an *Ophryosporus*, into which genus it would fall should the anther-tips

prove to be unappendaged, a matter not to be determined from a photograph, the only source of information at hand.

51. *E. MICROSTEMON* Cass. Dict. xxv. 432 (1822); Robinson, Proc. Am. Acad. liv. 295, 340, 356 (1918).—Cuzco: in cultivated ground, Santa Ana, alt. about 900 m., *Cook & Gilbert*, no. 1544 (U. S.). A weed widely distributed in the warmer parts of America. Not present in the earlier collections from Peru and perhaps a recent introduction in the country.

52. *E. VITALBAE* DC. Prod. v. 163 (1836); Bak. in Mart. Fl. Bras. vi. pt. 2, 305 (1876), excl. syn. *E. remotifolium* DC. which is exceedingly different.—LORETO: near Tarapoto, *Spruce*, no. 4106 (Gr.).

53. *E. INCARUM* Robinson. Smooth, but sticky, much branched shrub; leaves small, suborbicular, obtuse, shortly subcuneate at base, denticulate, 3-nerved from the base, punctate; heads about 5-flowered, short-pedicelled, cymosely disposed on the branchlets of the panicle, about 6 mm. long; involucre subcylindric; scales about 3-seriate, oblong, rounded at the tip, obscurely 2-3-ribbed, thin, subscariosus brownish straw-colored, slightly puberulent; corollas 3.7 mm. long, glabrous; the proper tube slender, 1.7 mm. long, the throat distinctly enlarged, cylindrical, 2 mm. long; anthers with an ovate round-tipped membranaceous apical appendage; style-branches filiform, recurved, rounded and perceptibly enlarged at the tip; achenes dark-brown, 1.5 mm. long, tapering downward, somewhat atomiferous on the faces; pappus-bristles about 30, fulvous, attenuate, 3 mm. long, nearly smooth.—Mem. Gray Herb. i. 122 (1917). *Baccharis microphylla* DC. Prod. v. 406 (1836), not HBK. *B. Candolleana* Steud. Nom. ed. 2, i. 177 (1840). *Brickellia microphylla* (DC.) Hieron. in Engl. Bot. Jahrb. xxviii. 583 (1901), not Gray.—PERU WITHOUT LOCALITY, *Haenke* (DC., detail sk. Gr.).

54. *E. WEBERBAUERI* Hieron. Round-branched shrub 1 m. high; branches dark-velvety, leafy; internodes rarely exceeding 6 mm. in length; leaves opposite, broadly ovate-oblong, obtusish or acutish, cordate, nearly entire or slightly crenulate, feather-veined and reticulated, above a little puberulent on the nerves, but soon glabrate and somewhat shining, below shortly white-velvety, the largest 1.5 cm. long, 1 cm. wide, on thickish petioles rarely more than 1.5 mm. long; heads densely and cymosely paniculate, 7-8-flowered, on pubescent pedicels (2-5 mm. long); scales of the 4-5-seriate involucre about 15, obtusish or (the outer) acutish, 3-5-striate, scariosus, ochraceous, puberulent, deciduous; corollas dull-yellowish, turbinate-subcylindric, gradually a little enlarged toward the summit, sprinkled with short-

stalked glands; achenes brown, covered throughout with subglandular hairs; pappus-bristles 50-60, yellowish-white.—Hieron. in Engl. Bot. Jahrb. xl. 369 (1908).—AMAZONAS: near Molinopampa east of Chachapoyas, alt. 2000-2300 m., Dr. A. Weverbauer, no. 4359.

Not seen, the description here condensed from the original diagnosis by Hieronymus.

55. E. CHAMAEDRIFOLIUM HBK. Nov. Gen et Spec. iv. 113 (1820); Benth. Pl. Hartw. 135 (1844); Robinson, Proc. Am. Acad. liv. 353 (1918).—PIURA? Originally collected “on the whole range of mountains” between Gonsanama, Ecuador, and Ayavaca, Peru, obviously close to the boundary between the two countries, *Humboldt & Bonpland* no. 3485 (Par., phot. Gr.). A specimen collected in the mountains of Loja, Ecuador, by Hartweg, and although unnumbered doubtless being a portion of his no. 759 cited by Bentham, l. c., is in the herbarium of the New York Botanical Garden. [Ecuador.]

56. E. MARRUBIIFOLIUM Hieron. Grayish villous-hirsute herb; stems terete, purplish, covered with a loose, at first spreading, at length mostly deflexed pubescence of slender white hairs; leaves opposite, broadly ovate, obtuse, crenulate except at the subcordate base, 1-1.5 cm. long 8-13 mm. wide, thickish, above finely bullate-reticulate with depressed veins, gray-pubescent, beneath shaggy gray-velvety, 3(-5)-nerved nearly from the base; petiole 3-5 mm. long, shaggy-villous; corymbs trifid, dense, the parts rounded; heads about 20-flowered, subsessile or shortly pedicelled; involucre campanulate, 3-4-seriate, brownish-stramineous; scales mostly ovate-elliptical, thin, rounded at the summit; corollas 3.5 mm. long, glabrous, scarcely enlarged upward; achenes (young) 2.2 mm. long, stramineous, at length turning dark-brown, slightly hispid toward the summit; pappus-bristles about 30, bright white, nearly equalling the corolla.—Hieron. in Engl. Bot. Jahrb. xxxvi. 466 (1905).—CAJAMARCA: between Chota and Cutervo, June, 1879, von Jelski, no. 799 (Berl., fragm. Gr.).

Sect. III. EXIMBRICATA (DC.) Hoffm. (See Robinson, Proc. Am. Acad. liv. 303.)

KEY TO SPECIES.

- a. Heads 3-10-flowered *b.*
- b.* Leaves pinnately veined..... 58. *E. exserto-venosum.*
- b.* Leaves 3-5-nerved from or somewhat above the base.
Branchlets and leaves glabrous; at least the lower teeth of the leaves widely spreading and very acute.
Petioles about 2 mm. long; leaf-blade about 8 mm. wide..... 59. *E. chilca.*
- Petioles 8-10 mm. long; leaf-blade about 1.6 cm. wide..... 60. *E. affine.*
- Branchlets and leaves puberulent or pubescent, sometimes glandular-puberulent..... 61. *E. heptanthum.*
- a. Heads 12- ∞ -flowered *c.*
- c.* Leaves sessile, but the blade gradually narrowed to a petiole-like base, thickish; involucral scales rounded at tip, grayish-velvety..... 39. *E. Commersonii.*
- c.* Leaves on wingless usually slender though sometimes short petioles *d.*
- d.* Leaves entire, large, 8-10 cm. wide..... 62. *E. uber.*
- d.* Leaves crenate to serrate, rarely more than 6 cm. wide *e.*
- e.* Leaves acute or acuminate at the base *f.*
- f.* Leaves 3-nerved from or somewhat above the base.
Heads 13-14-flowered; leaves 3-4.5 cm. long, on petioles 4-6 mm. in length..... 63. *E. cuzcoense.*
- Heads 20-25-flowered; leaves at maturity 5-8 cm. long, on petioles 1-2.5 cm. in length.
Scales of the involucre loosely ciliate toward the tip with jointed hairs; petiole pubescent, 1-2.5 cm. long; serratures 5-12 on each side of the leaf-blade..... 64. *E. tambillense.*
- Scales nearly or quite glabrous toward the tip; petiole minutely puberulent and sparingly muriculate, at most about 1 cm. long; serratures 11-23 on each side of the leaf-blade..... 65. *E. stictophyllum.*
- f.* Leaves pinnately veined.
Involucular scales linear, attenuate; leaves membranaceous..... 66. *E. simulans.*
- Involucral scales narrowly oblong, obtuse to rounded at tip; leaves coriaceous, with prominent reticulation on both surfaces..... 57. *E. fastigiatum.*
- e.* Leaves obtuse to cordate at base *g.*
- g.* Leaves pinnately veined..... 27. *E. endytum.*
- g.* Leaves 3-5-nerved from or somewhat above the base *h.*
- h.* Stems villous to hispid-pubescent with widely spreading and jointed hairs *i.*
- i.* Petioles rarely over 2 mm. long, about one-tenth the length of the leaf-blade..... 67. *E. cutervense.*
- i.* Petioles 5-25 mm. long, mostly one-sixth to two-thirds the length of the leaf-blade *j.*

- *j.* Heads 20-40-flowered; pubescence of the stem sparingly if at all gland-tipped.
Leaves crenate-dentate, more than two-thirds as wide as long.
Leaves deltoid-ovate, acute, mostly 2-3 cm. long..... 68. *E. vallincola.*
Leaves suborbicular-ovate, acuminate, mostly 4-6 cm. long..... 69. *E. articulatum.*
Leaves serrate, about half as wide as long..... 64. *E. tambillense.*
- j.* Heads 80-100-flowered; pubescence of stem gland-tipped and viscid..... 70. *E. probum.*
- h.* Stems sparingly to densely puberulent *k.*
- k.* Heads paniculate; inflorescence usually ovoid to pyramidal, the branches widely spreading *l.*
- l.* Heads subglomerate at the tips of the divergent branches of the panicle; leaves crenate; crenatures 13-22 on each side..... 49. *E. Cookii.*
- l.* Heads loosely disposed in the panicle *m.*
- m.* Leaves nerved essentially from the base.
Stem covered with a dark and dense gland-tipped puberulence; leaves crenate-serrate; teeth about ten on each side..... 71. *E. chorcephalooides.*
Stem covered with white or gray incurved scarcely or not at all glandular puberulence; leaves remotely cuspidate-dentate; teeth 4-6 on each side..... 72. *E. flexile.*
- m.* Leaves nerved from a point 5-10 mm. above the base.
Petiole 8 mm. long; achenes glabrous; leaves sharply serrate; teeth 11-19 on each side..... 72a. *E. Dombeyanum.*
Petiole 10-25 mm. long; achenes somewhat roughened between the ribs; leaves mucronate-serrate; teeth 5-12 on each side..... 64. *E. tambillense.*
- k.* Heads (tending to be crowded) in flattish or round-topped compound corymbs, or (when few) irregularly cymose on chiefly erect or ascending branches *n.*
- n.* Leaves for the most part conspicuously unequal-sided at the base; internodes very long (10-14 cm. in length)..... 74. *E. Sodiroi.*
- n.* Leaves essentially symmetrical at the base; internodes usually 2-5 (rarely 8) cm. long *o.*
- o.* Leaves small, 1-1.5-(2) cm. long, typically ovate, finely crenate-serrate; teeth about 5-7 on each side; slender-stemmed copiously branched shrub..... 75. *E. scopulorum.*
- o.* Leaves (at least the mature caudine) larger, 2-7 cm. long *p.*
- p.* Heads small, about 5 mm. high; leaves very shallowly mucronulate-serrate; stems nearly smooth but slightly and obscurely villous toward the summit; the hairs very slender, short, mostly straight, not glandular..... 73. *E. Gilbertii.*

p. Heads 7-9 mm. high; leaves more coarsely serrate; stems closely crisped- or glandular-puberulent.

Heads numerous in dense strongly convex or rounded corymbs; leaves broadly ovate, mostly rounded at the base (though sometimes with a short acumination at the point of attachment), serrate-dentate, the teeth numerous, usually 15-19 on each side, commonly blunt.....76. *E. Sternbergianum*.

Heads few, in flattish open corymbs or loosely cymose; leaves deltoid-ovate or lanceolate, commonly subtruncat or subcordate at base, coarsely and unequally crenate-serrate, the teeth mostly 5-10 on each side.

Heads about 7 mm. high.....76a. *E. glechonophyllum*.

Heads slightly larger, about 9 mm. high.....77. *E. azangaroense*.

h. Stems glabrous.

Heads about 5 mm. high; leaf-blade about 4 times as long as the petiole.....73. *E. Gilbertii*.

Heads 7-10 mm. high; leaf-blade 8-20 times as long as the petiole

Leaves rounded at base; petioles glabrous; involucral scales subscarious at tip.72a. *E. Dombeyanum*.

Leaves subcordate at base; petioles spreading-puberulent; involucral scales attenuate to a sharp non-scarious tip.....78. *E. isillumense*.

57. *E. FASTIGIATUM* HBK. Nov. Gen. et Spec. iv. 125, t. 347 (1820); Robinson, Proc. Am. Acad. liv. 307 (1918).—PIURA: in the cooler regions of the mountains between Guancabamba [Huancabamba] and the Paramo de Guamani, Humboldt & Bonpland, no. 3524 (Par., phot. Gr.).

This species is still somewhat problematic, being known only from the type material with which to date it has been impossible to identify precisely any of the modern collections. The species is clearly very close in habit, inflorescence, leaf-texture and leaf-venation to the variable *E. exserto-venosum* Klatt, but the leaves are more obovate or oblanceolate than in any as yet described variety of the latter plant. Moreover, the leaves are rather conspicuously and bluntly cuspidate at the tip. Finally Kunth, l. c., in describing the species states that the heads are about 12-flowered, that is to say have half again to twice as many florets as are found in *E. exserto-venosum* Klatt. Material approximating *E. fastigiatum* has been collected in Colombia (see Robinson, l. c.) but its identity must be subject to doubt until the type can be re-examined.

58. *E. EXSERTO-VENOSUM* Klatt, Abh. Naturh. Ges. Halle, xv.

324 (1882); Robinson, Proc. Am. Acad. liv. 358 (1918).—Variable in leaf-form as follows:

Var. α . **crenatum** (Hieron.), comb. nov. Leaves elliptical, obtuse, rounded at the base, shallowly crenate, 1.7–4.5 cm. long, 1.2–2.4 cm. wide.—*E. pseudofastigiatum*, var. *crenata* Hieron. in Engl. Bot. Jahrb. xxxvi. 468 (1905).—CAJAMARCA: near Cutervo, *von Jelski*, no. 789 (Berl., fragm. Gr.). PERU WITHOUT LOCALITY: *Mathews* (fragm. Gr.).

Var. β . **PSEUDOFASTIGIATUM** (Hieron.) Robinson. Leaves ovate-lanceolate, 3–5 cm. long, 1.6–2.6 cm. wide, acute or acutish at the apex, acute at base, finely serrate-dentate, the teeth subacute.—Proc. Am. Acad. liv. 359 (1918). *E. fastigiatum* Benth. Pl. Hartw. 135 (1844), not HBK. *E. loxense* Hieron. in Engl. Bot. Jahrb. xxi. 331 (1895), not Klatt. *E. pseudofastigiatum* Hieron. l. c. xxxvi. 467 (1905).—PERU WITHOUT LOCALITY: *Mathews* (N. Y.). [Southern Ecuador.]

Var. γ . **crenato-dentatum** (Hieron.), comb. nov. Leaves elliptic-lanceolate, acute or acutish at the apex, rounded at base, 5–8 cm. long, crenate-dentate or crenate-serrate, the teeth slightly coarser than in the preceding.—*E. pseudofastigiatum*, var. *crenato-dentata* Hieron. l. c. 468.—CAJAMARCA: near Cutervo, *von Jelski*, no. 730 (Berl., fragm. Gr.).

Var. δ . **lanceolatum** (Hieron.), comb. nov. Leaves lance-oblong, 9 cm. long, 3.2 cm. wide, acutish at the apex, cuneate at the base, crenate-serrate, the teeth again sparingly mucronulate-serrulate.—*E. pseudofastigiatum*, var. *lanceolatum* Hieron. l. c.—CAJAMARCA: near Tambillo, *von Jelski*, no. 729 (Berl., fragm. Gr.).

It is possible that this species, highly variable in its leaf-form, will ultimately be found to merge with *E. fastigiatum* HBK., but that is said to have heads about 12-flowered and its leaves, although possessing closely the pinnate venation and reticulation of *E. exserto-venosum*, differ in being oblanceolate, bluntly mucronate at the apex and narrowly cuneate at base. Much more ample material of these forms is essential before they can be classified with confidence. With the present fragmentary representation they can neither be reduced with certainty nor maintained with much satisfaction. But, as they differ, it seems best to keep them up until evidence of intergradation becomes available.

59. *E. CHILCA* HBK. Glabrous somewhat viscid shrub; branches opposite, erect, or curved-ascending, leafy when young, at maturity apt to be denuded; leaves opposite, rather narrowly lanceolate,

broadest about a sixth of the length above the entire rather rapidly narrowed base, gradually attenuate to an acutish tip, about 3 cm. long, 7-8 mm. wide, thickish-membranaceous and of rather firm texture, 3-ribbed from near the base, serrate from the broadest part to the tip, teeth about 8 on each side slightly curved outward, the lowest narrow and often slightly longer than the rest; petiole about 2 mm. long; corymb compound, many-headed, round-topped, rather dense, 6-9 cm. in diameter, leafy-bracted; heads sessile or short-pedicelled, about 4-flowered, 4 mm. long; corollas white, glabrous, slightly enlarged upward, fragrant; style-branches filiform, slightly thickened at the summit; pappus-bristles hispid-pubescent.—Nov. Gen. et Spec. iv. 125 (1820). *Ophryosporus chilca* (HBK.) Hieron. in Engl. Bot. Jahrb. xxii. 706 (1897).—CAJAMARCA: at the base of Mt. Sta. Polonia, near the city of Cajamarca, *Humboldt & Bonpland*, no. 3682 (Par., phot. Gr., Berl., phot. Gr.).

This and the two following species are very closely related and with the Bolivian *E. eleutherantherum* Rusby form a group doubtfully intermediate between *Eupatorium* and *Ophryosporus*. Their final disposition must await better and far more copious material than is yet available.

60. *E. AFFINE* HBK. Glabrous shrub, closely resembling the preceding; differing chiefly in its larger leaves (4 cm. long and 1.6 cm. wide) and longer petioles (8-10 mm. in length), also in its more loosely branched panicle, and 5-6-flowered heads of somewhat greater size (6 mm. long).—Nov. Gen. et Spec. iv. 126 (1820).—CAJAMARCA: thought to have been collected with the preceding, *Humboldt & Bonpland* (Par., phot. Gr.).

61. *E. HEPTANTHUM* Sch. Bip. Shrub, closely related to the two preceding, but the young branches and peduncles glandular-pubescent; leaves lanceolate or ovate-lanceolate, 1.5-2.5 cm. long, 5-12 mm. wide, acute at the apex, varying from obtuse to attenuate at the base, glandular-puberulent on both surfaces; petiole short and pubescent; heads in densish corymbs, about 7-flowered; involucral scales 7-8, subequal, linear, acutish.—*Bonplandia*, iv. 54 (1856), without descript.; Wedd. *Chlor. And.* i. 217 (1857), where first described; Sch. Bip. *Bull. Soc. Bot. Fr.* xii. 82 (1865), without char.; not, however, Rusby, *Bull. N. Y. Bot. Gard.* iv. 378 (1907).—PUNO: mountains about Azangaro, *Lechler*, no. 1751; on stony slopes among herbaceous plants and scattered shrubs, Puno, alt. 3600 m., 19 Aug. 1902, *Weberbauer* no. 1366 (Berl., fragm. Gr.). AREQUIPA: on sparsely covered ground, on the west slope of the Volcano Misti, near

Arequipa, alt. 3200-3600 m., 8 Sept. 1902, *Weberbauer*, no. 1426 (Berl., fragm. Gr.). TACNA (debated region): Cordillera of Tacora, *Weddell*.

62. E. UBER Robinson (p. 37). Robust shrub 4 mm. high, with luxuriant foliage; branches grayish-brown, granular-puberulent, leafy; leaves opposite, deltoid-ovate, acuminate, slightly undulate-denticulate or quite entire, abruptly narrowed and subcuneate at base, 16-19 cm. long, 6-9 cm. wide, above glabrous green, the reticulated veinlets depressed, beneath sordid-puberulent or -tomentellous; chief lateral nerves mostly 2 pairs leaving the midnerve about 1 cm. above the base; petiole 3-5 cm. long, granular-puberulent; panicle corymbiform, as much as 2 dm. in diameter, flattish or moderately convex, rather dense; heads excessively numerous, shortly pedicelled, about 13-flowered, about 9 mm. long; involucre narrowly campanulate; scales about 16, linear-oblong, acutish, subequal, erose-ciliolate, dorsally granular; corollas 5 mm. long, white, gradually and moderately enlarged upward; achenes grayish-brown, 2.5 mm. long, tapering downward, hispidulous on the angles; pappus-bristles about 31, dirty-white, barbellate, nearly equalling the corolla.—ANCACHS: woods, below Pampa Romas, between Samanco and Caraz, alt. 2100 m., *Weberbauer*, no. 3184 (Berl., phot. and fragm. Gr.).

63. E. CUZCOENSE Hieron. Shrubby, 1 m. high; stems terete, grayish-brown, smooth; branches opposite, ascending, finely puberulent, hairs crisped, incurved or appressed, not glandular; leaves opposite, lanceolate, attenuate, obtusish at base, serrate (teeth 5-12 on each side), firmly membranaceous, 3-4.5 cm. long, 1.3-2 cm. wide, glabrous, above dull-green, beneath somewhat paler, finely reticulated and punctate, subt' nerved from a point 1-2 mm. above the base, the lateral nerves reaching about to the middle; veinlets not prominent; petiole 2-5 mm. long; corymbs terminal, strongly convex to semiglobose, rather dense, 3-6 cm. in diameter, disposed in a leafy-bracted compound corymb; pedicels slender, 5-14 mm. long; obscurely puberulent, usually bearing a filiform bractlet; heads about 12-14-flowered, about 9 mm. long; involucre subcylindric-campanulate; scales subequal (except 2-4 of the outermost smaller ones), lance- or oblong-linear, acutish to acuminate, dorsally puberulent and sparsely glandular, ciliolate, mostly 2-costulate and 3-nerved; corollas purple-tinged, 5 mm. long, beset with sessile glandular granules; proper tube about 1.8 mm. long, slender; throat perceptibly enlarged, subcylindric, 3.2 mm. long; achenes brownish-black, at full maturity about 3 mm. long, tapering somewhat toward the base, closely beset with sessile and short-stipe1 capitate glands;

pappus-bristles about 25, white, scarcely roughened, slightly united into an annulus at the summit of the achene.—Hieron. in Engl. Bot. Jahrb. xl. 376 (1908).—CUZCO: near the city of Cuzco, *Squier* (Gr.), *Dr. & Mrs. J. N. Rose*, no. 19,028 (Gr., U. S., N. Y.); on Sacsahuamán Hill, in grassy and bushy places, alt. 3500–3600 m., *Weberbauer*, no. 4852; Ollantaytambo, alt. about 3000 m., *Cook & Gilbert*, no. 534 (U. S.).

64. E. TAMBILLENSE Hieron. Branches round, pubescent, at length glabrate and brown; internodes up to 8 cm. long; leaves opposite, ovate or ovate-lanceolate, acuminate, serrate except at the acute apex and rounded or shortly cuneate base (teeth 5–12 on each side, at most 1.5 mm. high, 7 mm. broad, mucronate), firmly membranaceous, bright yellowish-green, 3-nerved from a point 5–10 mm. above the base (nerves connected by subparallel transverse veins), attaining 8 cm. in length and 4 cm. in breadth, above puberulent on the nerves, the reticulated veinlets depressed, beneath pubescent on the nerves; petiole 1–2.5 cm. long; panicle leafy-bracted; pedicels as much as 1.5 cm. long, puberulent, bracteolate; heads 20–25-flowered; involucre narrowly campanulate; scales about 15, lance-linear, acutish, 3-nerved, about 6 mm. long, 2–3 of the outermost shorter; corollas about 4 mm. long, with more or less differentiated proper tube and throat, glabrous except on the limb, where sparingly beset with jointed hairs; achenes dark-brown, 1.75 mm. long (scarcely mature), smooth and shining on the faces, scabrid on the concolorous angles; pappus-bristles about 25, yellowish-white, not thickened toward the tip.—Hieron. in Engl. Bot. Jahrb. xl. 380 (1908).—CAJAMARCA: near Tambillo, 11 Aug. 1878, *von Jelski*, no. 668. No material of this has been seen by the writer. The description is here compiled from the original character.

65. E. STICTOPHYLLUM Robinson (p. 36). Shrubby, 1 m. high; stem subterete, costulate (when dried), purplish-brown, when young obscurely puberulent, opposite-branched, leafy up to or into the broad and flattish or moderately convex compound corymb; leaves opposite, ovate-lanceolate, caudate-acuminate at apex, abruptly subacuminate at the roundish base, serrate (teeth 11–23 on each side, mucronulate, often again toothed), firmly membranaceous, glabrous, above dull-green, beneath paler green, finely reticulate-veined and dark-punctate (veinlets not prominent), 6–8 cm. long, half as wide, 3-nerved from a point about 5 mm. above the base, the lateral nerves often dividing shortly after leaving the midnerve (or occasionally replaced by 2 adjacent and pinnately disposed nerves on one side);

petiole 7–11 mm. long, puberulent and sparingly muriculate; partial inflorescences rounded moderately dense fastigiately branched corymbs; heads about 24-flowered, 1 cm. long; pedicels filiform, 6–10 mm. long, bearing a filiform bractlet; involucral scales about 24, narrowly lance-linear, unequal but little imbricated, acute, mostly 3-nerved and 2-costulate, purplish-green, dorsally granular-puberulent; corollas about 7.8 mm. long, deep rose-colored, gradually and but little enlarged upward, glabrous; style-branches subuniformly filiform, not distinctly clavate; achenes (still immature) 3 mm. long, beset with sessile or subsessile glands; pappus-bristles about 27, white, scabrid, nearly equaling the corolla.—PUNO: Cuyocuyo, Prov. Sandia, in bushy places, alt. 3100 m., *Weberbauer*, no. 860 (Berl., phot. and fragm. Gr.).

66. *E. SIMULANS* Robinson (p. 31). Herbaceous or shrubby, 1–2 m. high, exceedingly similar in habit and foliage to the preceding; leaves smaller, 5–7 cm. long, 1.3–2.5 cm. wide, acute at base, scarcely or not at all punctate beneath, feather-veined, some of the lower lateral veins (often 2–3 on each side) somewhat more prominent than the others; petiole not at all muriculate; involucral scales mostly 1-ribbed, the upper part of softer texture, the outer scales somewhat pubescent and ciliate toward the base.—ANCACHS: among bushes in the gorge of a brook on the slopes of the Cordillera Blanca, above Caraz, alt. 3200–3600 m., 9 June, 1903, *Weberbauer*, no. 3253 (Berl., phot. and fragm. Gr.); among small bushes on a brook, above Oros, Prov. Cajatambo, alt. 3300 m., 2 Apr. 1903, *Weberbauer*, no. 2766 (Berl., phot. and fragm. Gr.).

67. *E. CUTERVENSE* Hieron. Low, much branched, scarcely lignescent, 1.5–4 dm. high; stems round, covered with dark articulated stiffish hairs; leaves opposite, subsessile or on very short petioles (scarcely 2 mm. in length), broadly ovate, cordate, short-acuminate, chartaceous, somewhat shallowly crenate, dull yellowish-green drying dark, when young sparingly beset on both surfaces chiefly on the nerves with rigid hairs, later glabrate above, somewhat 5-nerved, at most 2 cm. long, 18 mm. wide; corymbs or cymes loose, few-headed; pedicels sometimes as much as 5 cm. long; heads 30–35-flowered; involucra campanulate; the scales subequal, little imbricated, about 20, dull-green, lanceolate, acuminate, mucronate, villous-ciliate, sparingly villous dorsally on the upper part, the hairs jointed, flexuous, hyaline; corollas yellowish-white after drying, glabrous outside, 4.5 mm. long, the slender proper tube about equaling the enlarged throat; achenes dark, roughened on the upper part of the concolorous

ribs, scarcely 3.5 mm. long; pappus-bristles about 20, whitish.—Hieron. in Engl. Bot. Jahrb. xl. 383 (1908).—CAJAMARCA: near Cutervo, *von Jelski*, nos. 637, 701; near Tambillo, *von Jelski*, no. 612. [Southern Ecuador? see p. 10.]

This species, said to be near the Colombian *E. sotarense* Hieron., has not been seen by the writer and the above description is condensed from the original of Prof. Hieronymus. The species from character appears clearly distinct from other Peruvian Eupatoriums of its affinity by its small broadly ovate and nearly sessile leaves.

68. *E. VALLINCOLA* DC. Shrubby, erect or nearly so, 5 dm. high; stems (when young) and branches spreading-villous, the hairs jointed; internodes 2-3(-9) cm. long; leaves opposite, often proliferous in the axils, deltoid-ovate, acute, subtruncate to shallowly and openly cordate (shortly acuminate at the attachment), 2-3.5 cm. long and wide, 3-nerved from the very base, coarsely and often somewhat doubly crenate-dentate, above sparingly pubescent, beneath loosely villous especially on the nerves and veins (the hairs slender, flexuous, jointed); petiole 1.4-2.5 cm. long; corymbs terminal, fastigiatelike branched, rounded, few-many-headed; pedicels 6-9 mm. long; heads 20-25-flowered, 8-10 mm. high; involucre campanulate, the scales subequal, linear, acute, pubescent, mostly 2-ribbed; corollas white, 4.5 mm. long, hispid on the limb, with slender proper tube and moderately enlarged throat; achenes (immature) 1.6 mm. long, slightly contracted at the summit and tapering to the base, hispidulous on the angles; pappus-bristles very few, often about 10, delicate, white.—Prod. v. 168 (1836).—LIMA: mountains of Barranco near Lima, on calcareous rock, alt. 300-600 m., 23 Oct. 1902, *Weberbauer*, no. 1650 (Berl., fragm. Gr.). PERU WITHOUT EXACT LOCALITY: *Haenke* (DC, phot. Gr.).

Var. α . *TYPICUM*. Hairs of the stem, petioles, pedicels, and sometimes on the lower surface of the leaves long, slender, spreading, more or less conspicuously jointed.—Lit. and exsicc., as above.

Var. β . *BREVIPILUM* Robinson (p. 39). Puberulent to tomentellous, the hairs mostly short, neither gland-tipped nor conspicuously jointed; otherwise closely like var. α .—LIMA: on the Lima and Oroya Railroad, between Matucana and Tambo de Viso, on rocks, alt. 2370-2650 m., 26 Dec. 1901, *Weberbauer*, no. 103 (Berl., fragm. Gr.); on slope of eruptive rock, alt. 2370 m., 24 Dec. 1901, *Weberbauer*, no. 66 (Berl.).

69. *E. ARTICULATUM* Sch. Bip. ex Hieron. in Engl. Bot. Jahrb. xl. 385 (1908); Robinson, Proc. Am. Acad. liv. 316, 342 (1918).—CAJAMARCA: between Choto and Cutervo, *von Jelski*, no. 674, acc. to Hieron.

l. c. The following are with some doubt referred here: LORETO: Tarapoto, 1835, *Mathews*, no. 1417 (K.), and AMAZONAS: Prov. Chachapoyas, *Mathews* (K.).

Persistent effort has thus far failed to disclose in North American herbaria any material which can with entire confidence be placed in this species. It is hard to understand just why Hieronymus takes the trouble to distinguish the plant from the geographically remote and as to habit dissimilar *E. prunellaefolium* HBK. of Mexico, yet appears to feel no obligation to point out the much-needed distinctions between *E. articulatum* and the closely related *E. vallincola* DC. and *E. pichinchense* HBK. of similar Andean distribution. While it is impossible at present to unite these species, the types of which appear to differ in several minor features, the characters thus far known to separate them are exceedingly trifling, such as pubescence, length of the petiole, number and size of the teeth of the leaves, etc., matters in which considerable variation has already been observed.

70. *E. PROBUM* N. E. Brown. Herbaceous (at least above), much branched and very leafy, covered throughout with soft gland-tipped and viscid hairs; stems round, weak, pithy; leaves opposite or the upper subalternate, ovate, acute to acuminate, the caudine rounded to truncate or open-cordate at base, serrate (teeth about 7 on each side), thin, green and thinly pubescent on both surfaces, 3-nerved from the very base (the nerves villous beneath), 2-4.5 cm. long, 1.3-3 cm. wide, delicately membranaceous; petiole 1.5-2.5 cm. long, glandular-pubescent; corymbs terminal, fastigiately branched, flattish topped, sometimes 1 dm. in diameter, 12-15-headed, sometimes much smaller and only 1-5-headed; pedicels (in greenhouse material) 2-5 cm. long; heads 80-100-flowered, 12 mm. high and thick; involucre about 2-seriate, campanulate, the scales about 20, lance-linear, acute, thin, green and pubescent toward the mostly 2-ribbed base, scarious on the margin and toward the tip; corollas white, slightly puberulent on the short limb, the tube about 1.7 mm. long, slender, the throat subcylindric-campanulate, 3 mm. long; achenes upwardly hispid on the angles, about 2.5 mm. long, crowned by a shallow stramineous saucer-shaped disk; pappus-bristles bright white, delicate, nearly smooth.—Gard. Chron. ser. 3, vii. 321, fig. 48 (1890).—PERU: introduced into horticulture about 1870 by Mr. Wilson Saunders, who raised it from seed collected presumably in Peru by Mr. Farris. The cultivated specimen from which the above character is drawn is in the herbarium at Kew. It has thus far proved impossible to match it with any material collected in Peru.

71. *E. CHORICEPHALOIDES* Robinson (p. 8). Apparently herbaceous (the base unknown); stems and branches terete, flexuous, densely puberulent, with short brownish gland-tipped spreading hairs; internodes sometimes 1 dm. long; leaves opposite, deltoid-ovate, acuminate, subtruncate or shallowly and broadly cordate at base, serrate- or crenate-dentate (teeth unequal, rounded to subacute, about 10 on each side, the largest 2.5 mm. high, 5 mm. broad), membranaceous, above densely puberulent, beneath puberulent and on the nerves and chief veins spreading-villous, about 6 cm. long, about 4.5 cm. wide, 3-nerved from the base; panicle very loose and open, leafy-bracted, 4 dm. high, 3 dm. in diameter, densely glandular-puberulent throughout; pedicels filiform, 1-2.6 cm. long, naked or inconspicuously bracteolate; heads separate, about 7 mm. high, about 25-30-flowered; involucre campanulate; scales subequal, narrowly oblong or oblanceolate, erose toward the acute scarious tip, green and 2-3-ribbed in the middle, puberulent on the back, about 4 mm. long; corollas white, glabrous, the proper tube about equalling the subcylindric distinctly enlarged throat; teeth very short, 0.3 mm. in length; achenes light-brown, 1.8 mm. long, hispidulous on the angles, smooth on the concave faces; pappus-bristles about 12, whitish, minutely scabridulous.—AMAZONAS: Province of Chachapoyas, *Matheus* (K., phot. and fragm. Gr.).

This species in its loose inflorescence recalls the Mexican *E. choricephalum* Robinson.

72. *E. FLEXILE* Robinson (p. 14). Suffruticose, slender, tending to climb, 2 m. high; stems terete, flexuous, softly and shortly dirty-tomentellous; leaves ovate, caudate-acuminate, cordate at base, 5-7-nerved, thin, puberulent above, below especially on the nerves grayish-pubescent, about 6 cm. long, 3 cm. wide, slightly and remotely toothed; petiole 1 cm. long, slender; panicle ample, pyramidal, 2-4 dm. high, 1.5-2.5 dm. thick, loose, leafy-bracted; pedicels filiform, grayish-tomentellous; heads about 20-flowered, 7 mm. high, 6 mm. in diameter; involucre campanulate; scales about 16, linear-oblong, obtusish but sharply mucronate, mostly about 5 mm. long; corollas pale greenish-yellow, tubular, slightly and gradually enlarged upward; achenes grayish, 2.7 mm. long, hispid on the angles; pappus-bristles about 32, white, scarcely barbellate, about equalling the corolla.—ANCACHS: in woods near a river at Caraz, alt. 2200 m., *Dr. Weberbauer*, no. 3027 (Berl., phot. and fragm. Gr.).

A species recalling *E. solidaginoides* HBK. but with larger, more numerously flowered heads, longer achenes, and various minor differences.

72a. *E. DOMBEYANUM* DC. Prod. v. 167 (1836). It seems by no means improbable that this species (discussed in some detail on page 11) was originally collected in Peru. It reached DeCandolle devoid of data beyond the fact that it had been gathered in South America by Dombey (DC., phot. Gr.), whose explorations were chiefly in Peru.

73. *E. GILBERTII* Robinson (p. 16). Slender and nearly glabrous perennial herb, or perhaps shrub; stems greenish straw-colored, round, about 2 mm. thick, flexuous, at maturity entirely glabrous, when young sparingly provided with an inconspicuous pubescence of minute straightish non-glandular hairs; these becoming somewhat more abundant on the inflorescence; leaves opposite, ovate, acute or slightly acuminate, mucronulate-serrate or -crenate (the teeth inconspicuous, about 0.6 mm. high and 5 mm. apart), thin, membranaceous, above green and puberulent on the nerves, beneath somewhat paler and glabrous, 6-7 cm. long, 3-3.5 cm. wide, 3(-5)-nerved essentially from the rounded or subcordate entire base; petiole slender, about 1.7 cm. long, puberulent above; corymbs compound, flattish, rather loose; pedicels 4-10 mm. long; heads small, scarcely 5 mm. high or thick, about 26-flowered; scales of the campanulate involucle about 17, nearly equal, oblong-lanceolate, greenish-stramineous, acutish, scarious-margined, ciliate, sparingly pubescent on the back; corollas white, about 3.3 mm. long, the proper tube glabrous, about equalling the campanulate throat, limb hispidulous; achenes (very immature) 1.2 mm. long, apparently glabrous; pappus-bristles about 20, white.—CUZCO: San Miguel, Urubamba Valley, alt. about 1800 m., *Cook & Gilbert*, no. 1115 (U. S., phot. and fragm. Gr.).

74. *E. SODIROI* Hieron. in Engl. Bot. Jahrb. xxix. 12 (1900); Robinson, Proc. Am. Acad. liv. 362 (1918). *E. Sternbergianum* Ball; Jour. Linn. Soc. xxii. 43 (1885), as to plant first mentioned.—LIMA: in the middle region of the Andes in the upper valley of the Rimac River, alt. 1830-3355 m., April, *Ball* (Gr.). *Ball*, l. c., remarks that the plant grows to a height of several feet. [Ecuador.]

75. *E. SCOPULORUM* Wedd. Fruticulose, much branched, 2-5 dm. high; stems terete, slender, often decumbent, dark, nodose below after the early fall of the leaves; lower internodes 5-10 mm., the upper often 3-5 cm. long; leaves ovate, acute, rounded or subcordate at base, crenate-serrate (teeth about 5 on each side), membranaceous, 3-nerved from the base, slightly puberulent on the nerves, 8-18 mm. long, 5-12 mm. wide, scarcely paler beneath; petiole slender, 3-6 mm. long; corymbs terminal, simple and 3-5-headed or compound and

about 8-12-headed; pedicels 1-2 cm. long; heads 6-8 mm. high and equally thick, about 46-flowered; involucre campanulate; scales about 20, lance-linear, attenuate, slightly puberulent, mostly 3-nerved and 2-costulate; corollas purplish (Weddell) or white (Weberbauer), with slender proper tube (1.7 mm. long) and perceptibly enlarged cylindrical throat (3.6 mm. long); achenes 2.5 mm. long, hispidulous on the angles and faces; pappus-bristles about 18, delicate, white, barbellate.—Chlor. And. i. 216, t. 40, f. B (1857).—JUNIN: near Oroya, *Dr. & Mrs. J. N. Rose*, nos. 18,711 (N. Y.), 18,712 (N. Y.). PUNO: on moist cliffs around Lake Titicaca, alt. 3900 m., *Weddell*. ANCACHS: in open grassy formation between Samanco and Caraz, alt. 3700 m., *Dr. Weberbauer*, no. 3054 (Berl., fragm. Gr.). [Bolivia.]

76. *E. STERNBERGIANUM* DC. Apparently herbaceous, 4 dm. or more in height; stem terete, at first minutely puberulent, at maturity glabrate, dark-purple; leaves opposite, ovate, acuminate, rounded at the base, incisely serrate-dentate or deeply crenate-dentate (the teeth numerous, unequal, often again toothed), membranaceous, 3-nerved from the base, sparingly puberulent to glabrous above, scarcely paler and somewhat puberulent beneath, 3-5 cm. long, 2.5-4.5 cm. wide; petiole about 1 cm. long; corymbs dense, rounded; heads about 28-flowered, pedicellate, about 6 mm. high; involucre campanulate, the scales subequal, linear, acutish, about 2-seriate, sparingly puberulent or subglabrous; corollas white to reddish (Weberbauer), with proper tube nearly equalling the cylindric throat, nearly glabrous; achenes hispid.—Prod. v. 167 (1836).—ANCACHS: at Tallenga, alt. 3600-3800 m., *Dr. Weberbauer*, no. 2876 (Berl., fragm. Gr.). LIMA: at Obrajillo, *Wilkes Exp.* (Gr.); near Huarochirí, alt. 2100-3000 m., *Hrdlicka* (U. S.). JUNIN: near Oroya, alt. 3750 m., *Dr. & Mrs. J. N. Rose*, no. 18,685 (Gr., N. Y.). CUZCO: near Tinta, alt. about 3500 m., *Cook & Gilbert*, no. 213 (U. S.); Ollantaytambo, alt. about 3000 m., *Cook & Gilbert*, no. 331 (U. S.). DEPARTMENT NOT ASCERTAINED: among hills in the cordilleras of Peru, *Haenke* (DC.); at Pachacaya, *C. H. T. Townsend*, no. 1505 (U. S.).

This species according to Dr. Weberbauer is locally called *hualmi-hualmi*. He also states that the fresh roots, softened in lukewarm water, are employed as an abortive, and that a tea prepared from the leaves is used for kidney and bladder troubles.

[76a. *E. GLECHONOPHYLLUM* Less. *Linnaea*, vi. 105 (1831); Robinson, *Proc. Am. Acad.* liv. 363 (1918).—This species has not been seen from Peru, but as it occurs in the Chilean valleys and also without apparent distinction of form on the mountains of Ecuador,

it seems more than likely that further exploration will show its presence in the intermediate country of Peru.]

77. *E. AZANGAROENSE* Sch. Bip. ex Wedd. *Chlor. And.* i. 217 (1857); Robinson, *Proc. Am. Acad.* liv. 315 (1918).—PUNO: on calcareous rock, Azangaro, alt. 4000 m., 28 Feb. 1902, *Dr. Weberbauer*, no. 468 (Berl., fragm. Gr.). WITHOUT INDICATION OF DEPARTMENT: *de Castelnau* acc. to Weddell, l. c. [Bolivia, Ecuador, Venezuela acc. to Weddell.] A species doubtfully distinct from the preceding.

78. *E. ISILLUMENSE* Robinson (p. 20). Slender subscandent shrub, glabrous except on the petioles and base of the nerves where puberulent, nigrescent in drying; stem terete, pale-brown, internodes 3–8 cm. long; leaves opposite, ovate-oblong (the uppermost lanceolate), acuminate, slightly cordate at the base, mucronate-serrate, thin, 3–5-nerved from the base (the nerves connected by transverse veins), 10–12 cm. long, 3–4.5 cm. wide; petiole slender, viscid-tomentellous, 4–6 mm. long; panicle ovoid, loose, leafy-bracted below; pedicels filiform, glabrous, 8–15 mm. long, often with scale-like bractlets; heads about 52-flowered, 7 mm. high, 9 mm. in diameter; involucre broadly campanulate; scales about 30, subequal (1–3 of the outermost shorter), linear, very acute, glabrous, faintly 1–3-nerved; corollas 3 mm. long, white, glabrous, slightly and gradually enlarged upward; immature achenes 2 mm. long, apparently glabrous; pappus-bristles about 28, white, delicate, nearly smooth.—PUNO: in woods near the Tambo Isilluma, between Sandia and Chunchusnago, alt. 1000 m., *Dr. Weberbauer*, no. 1206 (Berl., phot. and fragm. Gr.). In habit and foliage recalling the Brazilian *E. laeve* DC.

Sect. IV. *PRAXELIS* (Cass.) Benth. (See Robinson, *Proc. Am. Acad.* liv. 318.)

KEY TO SPECIES.

Cauline leaves ovate, petiolate 79. *E. pauciflorum*.
Cauline leaves lanceolate to linear, sessile or nearly so 80. *E. kleinioides*.

79. *E. PAUCIFLORUM* HBK. *Nov. Gen. et Spec.* iv. 120 (1820); Robinson, *Proc. Am. Acad.* liv. 319, 343 (1918).—CUZCO: Santa Ana, alt. 900 m., *Cook & Gilbert*, no. 1606 (U. S.). PERU WITHOUT INDICATION OF DEPARTMENT: *Matheus*, no. 3081 (Gr.).

80. *E. KLEINIOIDES* HBK. *Nov. Gen. et Spec.* iv. 120 (1820); Robinson, *Proc. Am. Acad.* liv. 319 (1918).

Var. **typicum** (Hieron.), comb. nov. Hispid throughout; leaves lanceolate.—*E. kleinoides*, forma *typica* Hieron. in Engl. Bot. Jahrb. xxii. 782 (1897).—PERU WITHOUT LOCALITY: according to Hieronymus, l. c. 783. [Brazil, Venezuela, Argentina, Paraguay.]

Var. **SUBGLABRATUM** Hieron. Stems subglabrous or below sparingly and shortly pilose; leaves linear-lanceolate, glabrate except on the seabrid edge.—Hieron. l. c. 782, as *subglabrata*. *Ooclinium paucidentatum* DC. Prod. v. 134 (1836).—PERU WITHOUT LOCALITY: *Haenke* according to DeCandolle, l. c. [Argentina, southern Brazil.]

Sect. V. **HEBECLINIUM** (DC.) Benth. (See Robinson, Proc. Am. Acad. liv. 327.)

KEY TO SPECIES.

Heads 200-300-flowered; leaves on winged auriculate-based petioles.....	81. <i>E. nemorosum</i> .
Heads 50-75-flowered; petioles not winged.....	82. <i>E. macrophyllum</i> .

81. *E. NEMOROSUM* Klatt in Engl. Bot. Jahrb. viii. 35 (1887); Robinson, Proc. Am. Acad. liv. 327, 366 (1918). *E. pteropodum* Hieron. in Engl. Bot. Jahrb. xxix. 15 (1900).—CAJAMARCA: near Tambillo, *von Jelski*, nos. 737, 738, according to Hieronymus, l. c., as *E. pteropodum*. [Costa Rica, Colombia, Ecuador, Bolivia.]

82. *E. MACROPHYLLUM* L. Sp. Pl. ed. 2, ii. 1175 (1763); Bak. in Mart. Fl. Bras. vi. pt. 2, 345, t. 92 (1876); Robinson, Proc. Am. Acad. liv. 329 (1918).—CUZCO: Santa Ana, alt. 900 m., *Cook & Gilbert*, no. 1443 (U. S.). PERU WITHOUT LOCALITY: according to Baker, l. c. [Widely distributed in tropical and subtropical America.]

DOUBTFUL OR TRANSFERRED SPECIES AND VARIETIES.

E. ADENOPHORUM, var. *PERUVIANUM* Hieron. in Engl. Bot. Jahrb. xxxvi. 470 (1905). This problematic plant, collected in Cajamarca, near Tambillo, by *von Jelski*, no. 661 (Berl., sterile fragm. Gr.), was described by Hieronymus, l. c., as a possible variety of *E. adenophorum* Spreng. Syst. iii. 420 (1826). Sprengel's species, however, was a mere renaming of the Mexican *E. glandulosum* HBK. Nov. Gen. et Spec. iv. 122 (1820), on account of the earlier homonym of Michaux. As the latter is universally relegated to synonymy, there appears at

present no reason, according to the International Rules, to reject *E. glandulosum* HBK., a name which was amply characterized and put forward in all good faith. The plant of von Jelski, however, possesses a round-ovate instead of triangular-ovate leaf, and the indumentum, which Hieronymus finds similar, appears to the writer very different. In *E. glandulosum* the hairs are short, dense, and gland-tipped, in the von Jelski plant on the other hand they are flaccid, slender, jointed, and for the most part not gland-tipped. From the sterile fragment, kindly supplied to the writer at the Royal Gardens in Berlin during his visit in 1905, it would appear that the plant is certainly distinct from the Mexican *E. glandulosum* HBK. (*E. adenophorum* Spreng.), but until fertile specimens are available it is quite impossible to give the plant definite disposition.

E. AROMATICUM L., a species of Atlantic North America, extending from Massachusetts to Florida, was recorded as also from Peru by Lamarck, Encyc. ii. 406 (1786), on the basis of a specimen from Joseph de Jussieu. The plant was stated to be smaller than the North American and to have shorter petioles as well as other minor differences. Just what species Lamarck thus identified has not been ascertained, but there is no likelihood of its having been conspecific with the North American plant.

E. CANNABINUM L., the well-known European species, and the medicinal *E. TRIPLINERVE* Vahl (under the later name of *E. Ayapana* Vent.) were reported by Martinet, Enum. Jard. Med. Lima, 352 (1873), as cultivated in the Botanic Garden of the Medical Faculty at Lima; but there is little likelihood and certainly no evidence that either has at any time escaped or become established in Peru.

E. GLUTINOSUM Lam. Encyc. ii. 408 (1786); Robinson, Proc. Am. Acad. liv. 349 (1918). Described from a specimen in the Peruvian herbarium of Joseph de Jussieu, this species has been traditionally attributed to that country, though all its subsequent collections appear to have been in northern-central Ecuador. It is to be remembered that the boundaries of Peru in the middle of the 18th Century included what is now Ecuador and Bolivia, so it is pertinent to inquire where Joseph de Jussieu collected. According to Lasègue, Mus. Bot. Delessert, 484 (1845), Joseph de Jussieu went to South America as a botanist accompanying an astronomical expedition, which reached Quito in 1756 by way of Guayaquil. Thus de Jussieu must have been in the very region of Ecuador where *E. glutinosum* is now known to be frequent. It is true that he later traveled both in Peru proper and in what is now Bolivia, but the fact that he was also in the Ecuadorian

habitat of *E. glutinosum* makes it more than probable that it was there that he obtained the species. Certainly under these circumstances the fact that Lamarck's label mentions Peru as the place of origin can in no sense be taken as evidence that the plant came from what is now Peru. While it is by no means impossible, nor even very unlikely, that *E. glutinosum* may ultimately be found in Peru as now delimited, there is as yet no good basis for its inclusion in the Peruvian flora.

E. Kuntzei Hieron. in Engl. Bot. Jahrb. xxii. 766 (1897). This species, carefully studied from a portion of the material originally collected near Cochabamba by Kuntze (U. S.) and in better specimens subsequently secured in Southern Bolivia by Fiebrig (no. 3150, Gr.), proves to have the anthers destitute of apical appendages and the style-tips rather abruptly thickened, bluntish, and dark. It is unquestionably of the Subtribe *Piquerinae* and belongs to *Ophryosporus* § *Ophryochaeta*. When placed in its proper affinity, it has been found to match in all significant details *OPHYROSPORUS MACRODON* Griseb. Abb. Goett. xxiv. 173 (1879), a species heretofore known only from the Nevado del Castillo, Prov. of Salta, in northern Argentina, a locality within about 300 km. of Fiebrig's Bolivian station. To the writer the species appears to have no close resemblance to the well known and widely distributed *Eupatorium inulaefolium* HBK. to which Hieronymus regarded it most nearly related.

E. piqueroides DC. Prod. v. 175 (1836), from the mountains of Peru, is *OPHYROSPORUS PIQUEROIDES* (DC.) Benth. ex Bak. in Mart. Fl. Bras. vi. pt. 2, 188 (1876); Robinson, Proc. Am. Acad. xlii. 23 (1906).

E. SALICINUM Lam. Encyc. ii. 409 (1786); Robinson, Proc. Am. Acad. liv. 286, 348 (1918). Although credited to Peru originally by Lamarck and by various subsequent authors (including the writer) following his lead, the type of this species presumably came from northern-central Ecuador, through which Joseph de Jussieu, its collector, passed, a region where the plant has since been collected on several occasions so that its presence in some abundance there seems likely. Ecuador had not then been set off as a separate country. To date the writer has found no satisfying record of *E. salicinum* from within the present limits of Peru.

E. stramineum DC. Prod. v. 150 (1836). This species, supposed to have been originally collected in Peru by Haenke, has hitherto been represented, so far as known, by a single branch in the Prodromus Herbarium at Geneva. However, there is a photograph of this type in the Gray Herbarium, and this on careful microscopic study proves

to be unquestionably an *Helogyne* probably identical with *H. Weberbaueri* Robinson, Proc. Am. Acad. xlvi. 32 (1906). The plant therefore should bear the name ***Helogyne straminea* (DC.)**, comb. nov.

E. VAUTHIERIANUM DC. Prod. v. 159 (1836). By Baker in Mart. Fl. Bras. vi. pt. 2, 305 (1876), this species is said to extend from Peru to Panama and Nicaragua. Baker, l. c., cites certain specimens including Hayes's no. 589 from Panama and one of Tate's from Nicaragua. These are subsequently cited by Hemsley, Biol. Cent.-Am. Bot. ii. 102 (1881), under *E. vitalba[e]* DC. As *E. vitalbae* is a species well known and widely distributed from Peru to Nicaragua, while *E. Vauthierianum* is decidedly a plant of Atlantic Brazil, by no one else recorded in the Andean countries, there can be no doubt that Baker's note was intended not for *E. Vauthierianum* but for *E. vitalbae*, as confirmed by Hemsley's subsequent placing of the same Central American exsiccatae.

